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The regular monthly meeting of the American Academy of Dental Science was held at Young's Hotel, Wednesday evening, January 5, 1898, at six o'clock.

A paper, entitled "The Amalgam Question and Dentists with 'Yankee Wit,'" was read by Dr. C. H. Taft.

THE AMALGAM QUESTION AND DENTISTS WITH "YANKEE WIT."

BY CHARLES H. TAFT, A.B., D.M.D., BOSTON, MASS.

Mr. President and Fellows of the Academy,—One of the incidents of a recent dental meeting in this city calls to mind an excellent paper entitled "Character as demanded in Professional Life," by our esteemed friend, Dr. Eddy, published in the July, 1893, issue of the International Dental Journal. And the thought occurs that there are times in our professional careers when a re-reading of such papers might be of use if we are willing to profit by the helpful suggestions with which this particular paper abounds, and by recognizing the truth of what Dr. Eddy calls the "morally painful axiom 'that character in every department of life and action is a good investment,'—that, in fact, 'it pays.'"

It would be difficult for me to emphasize more emphatically this axiom than Dr. Eddy has done, whether it concerns us as dentists or men in other callings or walks of life. But the fact that there are times when men in dental meeting, as well as in private practice, appear to wink at, if not to openly countenance, questionable methods of practice, implying an utter disregard for the existence of any moral law, may well cause us to reflect how important it is to avoid, as Dr. Eddy has said, "by the slightest word or act anything which shall call down reproach upon our profession or upon us as men." The incident to which I have reference was in con

nection with the discussion of the subject entitled "A Consideration of the Objections offered by Physicians to Amalgam Fillings."

In the effort to show that the statements made by many physicians relative to the at times harmful effects of amalgam were not worthy of serious attention, one of the essayists advanced the argument that these fillings never had been and never could be a source of harm to any one, for the reason that dentists have been filling teeth with this material for sixty years with no serious results, so far as he knew. Any belief on the part of the patient that amalgam fillings were doing him harm the essayist felt was due entirely to the imagination, as could be abundantly proved by the use of a little strategy; and, as an illustration of what I regret to believe is a common practice with some in our profession who are unwilling to investigate in any dignified or thoughtful manner the objections offered to amalgam, the essayist cited a case where "a dentist, making use of a little Yankee wit, had said to a lady who wished to have an amalgam filling removed because it made her sick, 'I will replace this amalgam with silver,' and did so, the result being that she had no further trouble with it."

With the feeling that a subterfuge like this detracted from rather than added to the force of the arguments which the essayist advanced, its recital called to mind two somewhat similar cases in my own practice the past year, the first being that of a lady who said to me as I made an examination of her mouth, "My physician wishes me to tell you not to put any amalgam into my teeth." "I presume you know that you already have several such fillings," I said, upon making the examination. "Impossible!" she exclaimed. "Why, it is only three months since I went to Dr. ——, who put all those fillings in. I told him what I have just said to you concerning my own and the wishes of my physician, and kept saying to him, 'Now, doctor, you are not filling my teeth with anything that has mercury in it, are you?' 'Oh, no,' the dentist replied, 'there is nothing in this material that will prove of the slightest harm or injury to you.'"

To make a long story short, the lady was put to the pain, time, and further expense of having the fillings removed, simply because one of these "black sheep" in our profession, a *dishonest man*, with or without Yankee wit, caring nothing for his own honor and reputation or for his patient's welfare, was, presumably, too lazy and too ignorant to set about ascertaining in any intelligent manner whether the objections offered by the physician in this case were well founded or not.

Now, I submit that any man who, thinking to fool both patient and physician, will deliberately charge and accept a fee for a dishonest service like that fails to appreciate the obligations of his profession, besides placing himself in a very unenviable position.

The second was that of a gentleman who came to me as a new patient. Noticing, upon examination of his mouth, what an exceptionally fine set of teeth he had, and the presence of three or four amalgams where gold could as easily have been inserted, I asked through curiosity why his former dentist had elected to fill such simple cavities with amalgam. He replied, with much surprise, that he was entirely unaware of the presence of any amalgam in his teeth; that he had expressly forbidden his dentist to use it, and the latter had, as it proved, ignored his wishes. The patient left my office with the declaration that "he would make it warm for that man," and with an emphasis that left no doubt of his purpose to make good his word.

Now, gentlemen, my only excuse for bringing this subject before you is for the reason that I have come to take a great interest in it myself, and because I believe this Academy is both able and willing to discuss it intelligently. And because, furthermore, of an ever-growing conviction on my part that we have not begun to appreciate how many people at one time or another become susceptible to mercury, or whose systems are already poisoned from the effects of mercurial medicines in one form or another. Few of us as dentists, I believe, are able to recognize cases of either mercurial susceptibility or poisoning even though there may be abundant evidence standing out, as we say, "as plain as the nose on one's face," and instantly recognized by all who are familiar with symptoms of mercury-poisoning.

I do not hesitate to admit that I once had the same honest conviction I know many of you still have that a large class of physicians are entirely in error in the position they have taken relative to amalgam fillings. For a long time I found amalgam too convenient and useful a material in the saving of teeth to practically discard it because of what seemed to me mere whims on the part of physician or patient, and I did not feel at all troubled in a continued use of it, though I knew there was an ever-increasing class of physicians and laymen all over the country who objected to it.

I shall not attempt to convince any one by the use of Yankee wit or sharp practices that the harmful properties of mercury do not necessarily become inert or eliminated when the metal is combined with one or more metals in the form of amalgam, but will

ask you to follow me in my method of considering the question, and if there is anything of sophistry in such reasoning as I have to advance I trust no one will hesitate to make it plainly apparent.

Let me begin by repeating a statement which some one has made, and to which I think we can all assent, that "what is one man's meat is another's poison;" for within this statement lies, it seems to me, the key to a solution or to a better understanding of the question. In other words, we are forced to admit that there is a susceptibility in all persons to different drugs or noxious influences varying both in degrees and kinds.

Now, what do we mean by *susceptibility?* Let me offer a definition in the words of one of our friends in the medical profession that "it is an abnormal state of the system, owing to the presence of such morbid forces (generally inherited) which have the quality of attracting other and similar forces, and whose activity is in direct ratio to the lessened systemic resistance." This gentleman goes on to say that "drug forces in the organism follow the same law as acute morbid forces (when uncomplicated) in being self-limited. When drug forces produce an effect upon diseased conditions it is because there exists a certain degree of similarity between them. Drugs aggravate, ameliorate, or change diseased conditions when they have reference to quantity, degree of similarity, and plane of action, while the high dynamizations, instead of antidoting the effects of crude drugs, more nearly comply with the conditions of the sick-producing causes. Man is never made sick any length of time by a drug force unless he presents a susceptibility to its action, and this only proves a similarity of the drug to his condition, which may be curative in the proper potency." Let us consider these statements somewhat collectively and see if they are true.

Take a simple illustration. To a majority of people the common strawberry is a delicious article of food. To a minority it is a violent poison. How do we know this? Not because some one says so, but because we have seen cases where an indulgence in the fruit brings on at once well-marked and characteristic symptoms of distress. By taking note of and systematically recording every abnormal symptom in any part of the system of one who is susceptible to the poisonous properties of the berry we shall acquire definite knowledge as to the physiological action. We shall find that in one person it produces but a single symptom,—a spasm or contraction in the muscles of the throat, which prevents a swallowing of the berry,—while in another person it produces a violent itching

and burning sensation in different parts of the body, acute pains and more or less functional disturbance in general. It may affect no two persons alike, and yet when we compare the abnormal symptoms in their totality which the berry produces in a number of people who are susceptible to its toxic properties we find it has very marked characteristics that give it an individuality among drugs when considered as poisons.

Now, drugs which have toxic properties generally have medicinal properties. This is true of the strawberry, and the success which the physician of either of the homœopathic or allopathic school of medicine has in ameliorating or changing diseased conditions lies, I believe, in his ability to meet these conditions upon *similar planes of action.* Herein, too, lies the difficulty with physicians of either school in selecting that drug which, in its medicinal form and upon a similar plane of action, will successfully overcome and cure such conditions.

Now, while we are using the strawberry in illustration, let me say that I have among my patients a lady who from childhood was unable to eat strawberries in any form, but who could, after being *cured* with the same agent in its medicinal form, eat them with impunity. Do not infer from this by any means that the berry in its medicinal form is anything like an invariable specific for the cure of those who may be susceptible to its poisonous properties. That is an error into which many of us fall when we say that if, according to the law of similars, "like cures like," then a dose of strawberry in the medicinal preparation ought to cure one who is poisoned by it. Having, perhaps, tried it, and finding it does *not* always cure, we say the law is a humbug, and those who practise medicine in accordance with such a so-called law of cure are equal if not greater humbugs.

In the case just mentioned there happened to be a perfect likeness or similarity between the diseased condition and the medicinal action of the drug. If, as in other cases, there had been found to exist but a *partial* similarity, its effect in such instance would have proved only *palliative* or *partially* curative, and it would have been necessary to employ some other drug which would have entirely changed or removed the abnormal symptoms. That drug alone which is found to meet the totality of the symptoms will have the desired curative action. It is not a question for us to consider whether the drug be given in the crude or dynamized form to get the best results.

If we can keep in mind that it is always a disturbed condition

of the *vital force*, never the material organs and tissues of the body themselves, upon which the action of medicines is to be directed (the restoring of its equilibrium, in other words) we can understand, if we give the matter any thought whatever, that this vital force must be in its very essence a spirit-like force, and that it must be met with a similar force upon a similar plane, when it becomes necessary to restore its equilibrium.

I have used the strawberry as a convenient illustration of taking any drug we please and studying its properties and action in the same manner. In no different way may mercury be studied. I have heard it said in dental meeting that crude mercury is inert, and that in this form a man could take a pound or two without harm, incredible as this may seem. As a matter of precaution, however, I should urge the taking of crude mercury in a less heroic dose by those who desire to make special study of its physiological action. Personally, I should prefer to let the man who has a metallic lining to his stomach experiment with mercury in either one- or two-pound doses.

Substituting mercury, then, for the strawberry, let us consider for a moment some of its effects upon those who show a susceptibility to it.

I have among my patients a gentleman who cannot be in a room fifteen minutes where there is an uncorked bottle of the bichloride of mercury without experiencing a violent headache. In due season, after removal of the exciting cause, the headache disappears. This, to my mind, is conclusive evidence that the gentleman is susceptible to mercury. I should not have to remove his amalgams, if he had any, to be further convinced of the fact, and I assume that you would not ask me to demonstrate with scalpel and microscope the actual presence of mercury globules in the tissues and cells of his brain, and to furnish you in this way with some really scientific (?) proof that this gentleman is susceptible to and poisoned to a limited extent by mercury. I could not do it were I to try, nor could I prove it in the same manner if I stated that a patient who had chronic headaches was undoubtedly suffering from mercurial poisoning when a removal of the amalgams caused those headaches sooner or later entirely to cease. I have both the written and unwritten testimony of so many patients whose headaches have become a thing of the past with the removal of their amalgams that I am convinced these fillings very often prove a source of evil, —solely because of the mercury, understand me,—though I may not convince others with what appears to be conclusive evidence.

When headaches have reached the chronic stage I do not believe a radical cure is ever effected without good and sufficient cause. I believe the vital force is very often insufficient to combat the influence of a powerful drug force and to be affected by the right medicinal force until the obstruction to its curative action has been removed. In the case of the gentleman to whom I have referred, I have shown that the drug force was sufficiently powerful to throw the vital force out of equilibrium, and I feel confident that had he any amalgam fillings in his teeth a headache would not clear up so quickly as it now does with the removal of the bottle of bichloride.

We know very well that when a dead pulp causes an abscess to form, with a constant discharge of pus from a fistulous opening, no permanent cure of abscess or fistula is possible until the exciting cause acting as an obstruction is removed. We can with well-chosen remedies which control the suppurative process often palliate or cause a temporary cessation of the discharge just as it is possible to relieve headaches in the same manner. But until the exciting cause has been entirely removed a complete cure cannot be said to have been effected.

We may argue, if we please, that cessation or cure of chronic headaches upon removal of amalgam fillings does not prove these fillings or the mercury to be the exciting cause, or that they often act as an obstruction to the action of medicines. No more, then, does the fact that a fistula heals upon the removal of a dead pulp and subsequent treatment prove either the dead pulp to be the exciting cause or that *it* may often act as an obstruction to the action of drugs which have power to control the suppurative process. No more does a cessation of toothache by the application of aconite and iodine, oil of cloves, or other drugs prove that in some mysterious manner such remedies have had a palliative, if not a curative action, and been the means of restoring to the vital force its equilibrium. Much of our knowledge comes necessarily from both inductive and deductive reasoning, and is none the less scientific when by means of such reasoning we are able to systematically organize or classify it.

A very good evidence of a patient's susceptibility to mercury is the existence of a metallic taste in the mouth. I frequently hear patients complain of this without giving the matter a thought. How many of us do, in fact? Other evidences of mercurial poisoning are loss of appetite, followed by disturbance of the circulatory system, nervous irritability, and characteristic fetor of the

breath. The gums about the necks of the teeth become inflamed, spongy, bleeding, ulcerated, and sore to touch. Salivary glands inflamed, swollen, and also sensitive to touch. Secretion of saliva is augmented and it becomes of a ropy consistence, with offensive taste and smell. An interesting symptom is that of the tongue becoming coated with a white slime and bearing upon its edges the imprint of the teeth. I shall refer to this presently.

Mercury has an affinity for all mucous membranes, especially of the mouth, throat, and nose, producing in the latter great congestion and catarrhal inflammation. It is in cases of chronic catarrh particularly that physicians who are careful and accurate prescribers find themselves so often hampered and baffled in their efforts to cure the patient until all amalgam fillings have been removed. Even then it often requires time to effect a permanent cure owing to the difficulty in removing entirely the poisonous effects of the metal from such systems as have become more thoroughly permeated with it.

The manifestations of mercurial poisoning upon the mucous membranes of the mouth, throat, and tonsils are too well known to be mistaken by one who is familiar with them; though without giving the matter the slightest thought or study we are quite apt to argue that the physician is confounding such inflammations or ulcerations with fistulæ of alveolar abscess or with inflammations of tissue caused by the ragged edges of amalgam fillings inserted by some careless or slovenly operator.

Oftentimes a susceptibility to mercury is the result of long exposure, while again it may be brought about in a very short time. Sometimes the influence of mercury falls upon a single part of the system,—the nervous, for instance,—when as vapor it finds its way to the blood through the lungs, resulting in a paralytic condition.

I remember reading of a case where two barometer-makers became badly poisoned by sleeping one night in a room where there was a pot of mercury on the stove. One was severely salivated, the other contracted a shaking palsy from which he never recovered.

Rather exceptional cases like these, however, do not prove a general susceptibility to mercury, nor that the majority of barometer- or mirror-makers are poisoned to any alarming extent from continued exposure to the vapor of mercury, any more than the fact that now and then some one working in a match-factory and developing phosphorus-necrosis of the maxillary bones establishes proof of a susceptibility to phosphorus in the majority of factory hands employed.

The symptom of the tongue bearing upon its edges the imprint of the teeth calls to mind a patient whose amalgams I removed while practising in Chicago. An extract from a recent letter in which the patient gives a report of himself may be of interest.

"While the amalgam fillings were in my teeth," he writes, "I had a decided and ever-present metallic taste in my mouth, and on arising in the morning my mouth seemed filled with this taste, which no amount of cleansing with brush and powder would wholly take away. This, however, disappeared with the amalgams. My tongue also showed the imprints of the teeth and does some yet, but they are going away slowly." This gentleman had been a sufferer from chronic headaches, bleeding piles, and other troubles, "all of which," he writes, "have disappeared for good." He adds, "I am now feeling fine in every way."

The fact that the system is often a good while in ridding itself from mercurial taint is well illustrated by this particular case. Sooner or later his tongue will show no imprints of the teeth whatever.

Now, this patient has not the *slightest* knowledge, so far as I know, that the symptom just mentioned is a strongly characteristic one of mercury. How many of us would recognize it as such? Not one dentist in fifty, I will venture to say, would recognize that or a great many other symptoms which a physician is quick to perceive as clearly characteristic of mercury. This, too, is but one out of perhaps many similar cases coming to all of us every day. An examination of the mouth revealing the presence of one or more amalgams affords us neither knowledge nor suspicion that the patient is susceptible to or, perhaps, already poisoned by mercury, whether to a greater or less degree it matters not. Judging by the kind of arguments I have heard advanced by some whose one object is, manifestly, to ridicule rather than to thoughtfully consider the objections offered to amalgam and to advance any dignified argument against these objections, I am certain it would not afford the *slightest* interest to such men even though there were unmistakable evidences of it. It is not always agreeable to recognize a *fact*, much less, perhaps, to admit it when recognized.

We say we never heard of any one who was poisoned or harmed by amalgam fillings. Perhaps there is good reason for this. Who does a patient consult when he is sick? Is it the dentist? It quite possibly might be if the patient considered the latter competent to either treat or cure him. He has confidence in our ability to put his teeth in good order and generally consults us for that purpose

alone. But in our knowledge of diseased conditions and their obscure causes (with the exception of those pertaining to the oral cavity) the average layman, I maintain, has none, and *rightly* so. He would be justified in a similar lack of confidence in the physician's knowledge and skill in matters pertaining to our specialty. For that reason when in need of our services and advice he consults the dentist, not the physician.

But the physician who objects to amalgam on general principles does not deny that, considered as a filling-material alone, it serves a useful purpose in the saving of teeth. He does not assert that all people are at all times and under all conditions susceptible to mercury. He knows, however, that a susceptibility may be established at any time. He knows, as I, too, have learned, that when a drug force exerts a curative influence upon diseased conditions (or morbid forces) it is because there exists a *similarity between them.* If there is no effect, it must be for want of such similarity, as is the case when medicines are not well chosen, or because there is a stronger force acting either as an antidote or as an obstruction to the action of the remedy.

The objections offered to amalgam fillings by many physicians in both the leading schools of medicine seem to have stirred up a mingled interest, prejudice, and opposition among members of our profession. Many have shown and continue to manifest a desire to discuss the subject for the purpose of finding the truth. A few have argued and continue to assert, in spite of all evidence to the contrary, that the objections come *entirely* from physicians of the homœopathic faith, and for that reason alone are not worth considering, carrying their prejudices so far as to oppose the subject appearing for discussion on the programmes of several dental societies right here in the Commonwealth of Massachusetts, a State in which the right to freedom of thought and speech is, fortunately, seldom questioned. Such an opposition in *this* city or State by any member of the dental profession who courts such notoriety is too childish and silly to deserve one moment's serious attention.

From my view-point, the opinions of any man or set of men of recognized educational or professional attainment, who earnestly, conscientiously, and successfully devote their lives to the practice of medicine, are entitled to respect and thoughtful consideration. Personally, I respect and admire a physician of *any* school of medicine who, recognizing his inability to effect a cure in any particular case until all amalgam fillings have been removed, frankly tells the patient this. He shows himself at least to be too honest a man to

continue taking his patient's money knowing he is not rendering a full equivalent for value received.

Do not misunderstand my position and assume that I would never under any condition sanction the use of amalgam. That it has its usefulness as a filling-material I freely admit, and for a long time I entertained the same thoughts and opinions concerning the objections to it that perhaps a majority of this Academy still do. With an independent study into the merits of these objections, the weighing of evidence as it has been presented to me by patients, and the willingness to recognize and admit as facts things which one could not dispute if he would, there has come a change of opinion on my part. But let no one infer for that reason that I wish to cast the slightest reflection in whatever I have said upon the opinions of any one who honestly differs with me. I do stand here, however, to encourage in *this* society—at least, never to discourage—an open, honest, manly discussion of this or any other subject that is of interest to us or to our patients. An ever-increasing number of men and women all over the country are discussing the question among themselves. Why not we? I believe, moreover, that when a patient tells us it is the wish of his physician that all amalgam fillings be removed, the work should be commenced and thoroughly and conscientiously carried through to the finish unless there is good reason for our wishing to first consult with the physician.

Far be it from me to pose as a moralist or to dwell at length upon the necessity of drawing fine distinctions between what a man's professional conscience tells him is right or wrong so far as his business dealings with patients is concerned. I only wish to emphasize my own disapproval of such methods of practice as those to which I have referred in the early part of this paper, and which, if generally employed, could not fail, and *justly* so, to bring discredit not only upon those who practised them, but upon a profession which we should wish to see honored, never disgraced. *An honest argument never needs the support of a dishonest trick.*

In conclusion, permit me to say that if I have learned anything which seems of value to me in the study of this question, it is my desire to give the benefit of it to others. The testimony which I have received from those who have experienced the benefits following removal of their amalgams furnishes me, at least, the pleasant satisfaction that in an unassuming way I am often doing what I can to *assist*, rather than *hamper*, the physician in that noblest of all works, the healing of the sick.

In whatever ways as individuals we choose to investigate the

objections offered to amalgam, we shall not go far wrong in this or any other line of study which will add something of value to the common fund of knowledge, if we keep in mind the advice of Polonius to his son,—

> "This above all,—to thine own self be true;
> And it must follow, as the night the day,
> Thou canst not then be false to any man."

Dr. Taft.—Mr. President, before the subject is thrown open for discussion, I want to speak of a case which I had in hand last week.

A former patient of mine, who had removed to the western part of the State, where she has lived for the past five years, was visiting Boston, and came in for an appointment. She told me she had been having constant trouble with her throat for the past few years, and without being able to obtain any relief; that she had made arrangements, by the advice of her physician, to go to Southern California for a year. Her physician confessed to me that it was the worst case of sore throat he had ever seen. He had tried all kinds of remedies and treatments with no effect whatever, and she was unable to eat with any comfort because it was so painful for her to swallow. I made a superficial examination of the mouth and found the hard palate badly inflamed and the tonsils covered with ulcers. I remembered that I had several years ago put in three or four out of the eight or nine amalgam fillings that she had in her mouth, and I said to her after some little conversation, "I believe your trouble is greatly aggravated not only by the red rubber plate, but by all your amalgam fillings."

"That is just what my physician said," she replied. He was an allopathic physician, by the way, and had told her over a year ago that he had in mind sending her to her dentist to have the amalgam fillings taken out, but he thought that in any event a change of climate would have a very beneficial effect. I felt a great deal of interest in this case, and advised her not only to never put that red rubber plate in her mouth again, but to allow me to remove those amalgam fillings without expense to her. She agreed to this, and the work was completed day before yesterday. She came into my office yesterday morning and said to me, in a laughing way, "I certainly do feel better already, but whether it is due to imagination or not I cannot say. I haven't that 'blistered' feeling in my throat, and if it were not that arrangements have been so fully completed, I believe I should be almost tempted to give up going

to California." I said to her, "If you are better, I am glad of it. I shall hope to hear, after you have reached California, not only that your throat is improving, but that you are fast gaining health, and I should advise you, when you go home again, to put that red rubber plate into the fire." She agreed to do it.

I shall be very much interested in watching this case, and will report to the Academy further in regard to it. If we find she gets better, we can attribute it to the imagination, to the change of residence, or to the removal of the amalgam fillings, whichever way we happen to feel about it.

DISCUSSION.

Dr. Allen.—When Dr. Taft invited me to open this discussion of a somewhat unpopular subject, I suspect he did so because I represent some of the views of a minority of dentists and physicians who hold that the presence of mercury in amalgam fillings is, under certain circumstances, prejudicial to the health of the patient.

It is not my purpose to offer any new argument in support of the views so well presented by our essayist in the paper just read, as well as in those presented by him on previous occasions. His plea for a calm consideration of the subject, based on clinical and experimental investigation, is the point which I desire to emphasize, and which ought now to guide us in our discussion. Let us approach the question as students, seeking whatever truth lies hidden therein, for in doing this we shall only follow the rational methods of the lover of science, and thus avoid useless controversy.

I do not profess to have wholly discarded amalgam from my practice. I occasionally find it useful in spite of its many defects as a filling-material, and shall doubtless use it more or less until a satisfactory substitute is found.

The susceptibility to the effects of mercury, as well as to other drugs, varies greatly with different individuals, and perhaps with the same individual under varying circumstances. It may be the exception for one of our patients to be at all affected by the mercury contained in amalgam fillings; but the fact appears to be well established of persons having been even seriously affected by this substance, which has been so indiscriminately used in the mouths of our patients by many members of the profession.

Our use of drugs being rather limited on the whole, and largely confined to local applications, we cannot claim to be expert observers of their more obscure physiological effects. On the other hand, when the physician, whose business it is to know just what a drug

is capable of accomplishing in the human organism, has reason to believe that his patient is susceptible to small quantities of mercury, the dentist, unless he possesses superior knowledge of that particular case, should hesitate before assuming the opposite opinion.

We have had the experience in our dental meetings of hearing this subject treated with ridicule, and with expressions of personal prejudice, *pro* and *con*, much to the regret of those who appreciate the efforts and motives of the intelligent truth-seeker. It is to be hoped, therefore, that we will not pass this subject without a show of interest in its truly scientific aspect.

Dr. Bradley.—Whether we agree with the essayist or not, I think we shall all be willing to give him credit for a paper written with the purpose of presenting this subject fairly and judiciously. I was surprised to learn from his statement that there were dentists who would pretend they were filling the teeth with one material while they were using another. No conscientious dentist would do such a thing. Whether we agree with the writer's theory or not, we should let the patient know, if he asks for the information, what we are doing for him, and without any ambiguity in terms. If a patient desires that his tooth shall not be filled with amalgam, we should do the best we can with some other material. We certainly should not deceive him, for it is not professional.

In the course of a conversation with a prominent physician of the old school, he asked me about rubber plates and whether I ever noticed any ill effects from them. He gave it as his opinion that no person should ever wear a rubber plate; that they were exceedingly injurious to the membranes of the mouth, and he drew for me a diagram of one made from compressed paper. He said that they now make almost everything of compressed paper, and it would be lighter and would not poison the mouth. He was very sure that the rubber with mercury in it was injurious to the throat. Dr. Taft claims that the objection to mercury is not confined to the homœopathic school, and I merely speak of this as one instance corroborating his claim. I use amalgam fillings, and believe they are a great help in saving the teeth, and yet at the same time believe in the homœopathic system of treatment. I would like to know more about this. I believe that amalgam fillings are valuable in saving the teeth, and yet if my patients requested me not to use amalgam, I should comply with their desires and substitute something else. I would try to be honest with them, at all events. As Dr. Taft quoted very pertinently, I would be "true to myself," and in that way would do them no wrong.

Dr. Barker.—I have been wondering whether it was because of the dislike the members have of revising the stenographer's notes that they refrain from saying anything on this subject. Manifestly, the only way we can tell whether strawberries are going to poison us or not is to eat them. If they do, we shall be obliged to give up eating them. Manifestly, also, the only way we can tell whether amalgam fillings are injurious to a person or not is to put them in and note results. If they do prove injurious, really and actually, or if some physician thinks they are, then we can take them out and do the best we can with other materials. But I submit that until it can be proved that strawberries are injurious to the human race, as a whole, we shall continue to cultivate and eat them, and I submit likewise, Mr. President, that until it can be proved that amalgam fillings generally, or even in a small minority of cases, are injurious, the dentist who has a general practice to conduct and who has to take into consideration a variety of things, and among others the ability of the patient to pay fees, will be compelled to use dental alloys.

I have not the slightest disposition to ridicule this subject. I want to hear all the objections that can be brought up against amalgam by those who are making a study of it; it is certainly a subject the Academy ought to consider.

Is there any way by which the mercury we combine with an alloy and insert in a tooth can do injury, except as it shall become volatilized and taken into the system, and cause a loss of weight in the filling. Has any one inserted in a tooth an amalgam filling the weight of which he knew absolutely, and, after a time, taking into account the loss which would result from attrition, has he carefully removed the filling and ascertained whether it had lost weight, and if it had, has he ascertained whether a disproportionally large amount of mercury is lacking or not?

I remember reading somewhere the report of a committee appointed to investigate the possibilities of injurious effects from red rubber plates, and their report, after having made a thorough and exhaustive investigation, was to the effect that there was no evidence whatsoever, that they were able to obtain, that the mercury that had been present in the rubber plate had been lost after a certain length of time. The mercury did not get away from the plate and get into the system, and if it did not, how could it do harm? Does the mere presence of the mercury, either alone or combined with the alloys, produce unfavorable results? If it does, then, of course, we ought to determine in the case of each individual

patient who presents himself to us for our services whether the risk to that patient is sufficiently great to justify us in denying him the use of amalgam, and in substituting therefor gutta-percha or zinc phosphate, or in being charitable and putting in gold. The essayist admits that there is no general over-susceptibility to influence of mercury, or to amalgam fillings, and it occurred to me that, as we save thousands and tens of thousands of teeth every year by their use, we had better continue their use until we find a case where there is pretty good evidence that they are poisonous to a certain patient, then let us remove them and put in whatever the patient demands or whatever they can pay for.

It is an old subject, it has been threshed over and over, and yet I presume there are some grains of wheat yet in it, and I am glad to see the Academy is willing to try to find them. Let us meet the question in a fair and candid spirit, and I have no doubt we shall find some profit in the discussion of it.

Dr. Andrews.—I wish in the first place to congratulate the essayist on the very admirable way in which he has presented the subject to us.

I shall speak for a moment on one phase of this question, and that is, the power of mercury to penetrate minute canals. It is a fact, gentlemen, that globules of mercury are forced into the dental canals, and in the case of pulpless teeth forced through the canals to an incredible extent. It is perfectly surprising how mercury will travel into minute openings. Some of you have bought your mercury in the little wooden bottles as put up by some of the supply houses. If you split these bottles open, you will find mercury running all through the grain of the wood. I remember having shown the Academy, in one of my demonstrations on tooth-structure, a section of a tooth that had been filled with amalgam, a section having the canals of the dentine completely filled with the minute globules of mercury; now, when we reflect that those canals are only about one-ten-thousandth of an inch in diameter, we can see that mercury forces itself into very minute openings. I am making a series of investigations on freshly extracted teeth, that had live pulps when they were extracted, with an idea of finding whether these globules will penetrate into the canals when the fibrils are still present. I will give the results of these investigations at a later meeting. I have here one of the wooden bottles which has held mercury. I shall pass it around with a magnifying glass, and you can see for yourself the globules of mercury in the grain of the wood. It looks as if you had taken a lead-pencil and drawn a very

fine line in the interior of the wood. When I discovered this fact, I notified some of the manufacturers that, by placing the mercury in the wood just as it was turned, they were really wasting some of their mercury, and we were not getting the benefit of all we paid for, because the mercury was forcing itself into the substance of the wood. There has since been an effort on the part of the bottlers to guard against this by varnishing the inside of the wood with some thin varnish and letting it dry. It was thought that by doing this it would fill up the pores of the wood and make a surface that would not take mercury. I show you to-night, however, some bottles that have been varnished, and the mercury still runs down into the fibres of the wood. I have mounted a number of sections taken from different pieces of these wooden bottles; in some of which the openings are quite minute, but they are completely filled with mercury. It has been my practice for several years when filling teeth with amalgam to line my cavity, and I think it is the best practice. It not only gives you a clean tooth, but prevents the possibility of the mercury going into the tooth-structure. I use amalgam where I think its use is indicated. I tell my patients before using it that there are objections to its use by some physicians. I tell them that I do not believe such fillings can do harm. At the last meeting of the dental section of the American Medical Association, held in Philadelphia, the subject of amalgam fillings was brought up by Dr. Bonwill. He wanted very much to have a committee from the dental section examine the mouths of some of his patients. It was voted to have a committee call at Dr. Bonwill's office the next morning and make the examination. At the appointed time the committee met at Dr. Bonwill's office, and found that he had collected about forty persons, the majority of whose teeth were found filled with amalgam, and Dr. Bonwill wanted to show that amalgam, when properly used, would not produce ill effects. I do not think there were ever seen a healthier set of mouths, and this was the unanimous voice of that committee.

I would urge that before you put in amalgam fillings you would line each cavity with some kind of cement. In the cases of large fillings I make a practice of filling the cavity partly with oxyphosphate, packing the amalgam into this. I think it is on record that gold is a dangerous article to use in the mouth in some cases, and I remember reading a paper describing the bad effects which the writer had noticed caused by filling teeth with oxyphosphates and oxychlorides. It may be that there are some such cases, but I doubt

very much if amalgam, properly used, will do any harm in the large majority of cases.

Dr. Banfield.—May I ask Dr. Taft, if he entirely discards the use of amalgam because of these few cases in which he has noticed bad effects resulting from its use?

Dr. Taft.—I have practically discarded it. I do not use on an average an ounce in a year.

Dr. Banfield.—If that is so, Dr. Taft goes a step further than physicians in the use of drugs. Not long since being lame and sore from the effect of a cold, various remedies were tried without giving relief; finally rhus tox. cerate was applied externally.

This remedy had been used by others through the advice of a physician for rheumatic troubles and had produced no disagreeable effects. The following day wherever the application had been made an eruption appeared, which caused much suffering and confined me to my bed for several days. I afterwards made inquiries of Otis Clapp & Co., manufacturers of this drug, and learned from them that occasionally similar disturbances arise, but that as the cases are so few physicians do not consider it necessary, in prescribing it, to especially caution patients in its use.

Now, here is a drug that does irritate in some cases, and is a poison to some persons, but because of these few, isolated cases physicians do not discontinue its use, so I do not see why we should discard amalgam because it creates a disturbance in a small percentage of cases.

Dr. Smith.—This is the old case of amalgam on trial. Certain medical practitioners allege that amalgam fillings are poisonous, injurious, and should not be used. They have settled that matter for themselves, and from their stand-point it should no longer be discussed. I understand a bill has been, or will be, presented to this Legislature, prohibiting dentists from using amalgam as a filling. No dentist, if he can be convinced that amalgam is injurious, would wish to use it; in fact, from a pecuniary stand-point, it would be beneficial to him if he could not use it, because it means in cases where gold is contraindicated that he has the opportunity to fill and refill and fill again. Therefore, from that stand-point, from the sordid stand-point of gain, he should support that bill. But, on the other hand, gentlemen, see what hardship it works upon the poorer class of people who cannot afford gold and are obliged to undergo the expense of replenishing cements and gutta-percha, and none here, I think, will deny that the cements and gutta-perchas do need replenishing, and oftentimes at the expense of the tooth-material.

Now, to prove this claim that amalgam is injurious these gentlemen cite cases similar to those which the essayist has cited in his paper,—cases where they have treated certain troubles with, as I presume, the proper remedies, and, finding no headway, have had amalgam fillings removed, with the pleasure of seeing the patient go on to a speedy cure. Now, what is the offset to those cases? In my practice I have had two, of which I will speak, and possibly, if we are observing, we may find still more evidence in the same line.

A certain patient was in my hands for the care of her teeth, and also in the hands of a prominent homœopathic physician for some other trouble; knowing the fact that she was being treated by a homœopathic physician, I never thought for a moment of using anything in her mouth but cements and gutta-percha. That patient continued under treatment for two years. If that patient had had amalgam fillings, they would have been ordered out as being the cause of her trouble, and had she recovered in that time, the conclusions would apparently have justified this belief. Circumstances called her to another city, where she was treated by an equally prominent homœopathic physician, and one who supported the high potencies with as much fervor as her physician here. She also came into the hands of another dentist, who, probably, knowing nothing about the objections of homœopathic physicians to amalgam, removed the cements and gutta-percha and replaced them with amalgam, so that when she came under my notice again I was surprised to find these molars well filled with amalgam, and the patient was perfectly well. Now, if the argument is good on one side, that amalgam fillings prevented the cure, then that same argument holds good on the other side,—that putting in amalgam fillings cured her. To my mind, if one is good logic, the other is equally good logic, and I do not see how you can escape it. I have had two such cases.

I think that this charge against amalgam is still unproved; but I do admit that there are idiosyncrasies on the part of some people, and that they may be susceptible to amalgam, and that it will affect them in peculiar ways. We also know that bicarbonate of soda will produce a severe inflammation of the mucous membrane in some cases, yet we would not go before the Legislature with a bill prohibiting the use of bicarbonate of soda as a mouth-wash.

From these high potentists comes the assertion that a large number of suicides are caused by the presence of gold in the teeth. I am merely stating facts, gentlemen,—and if to state facts is to

ridicule, then let it be so. Aurum is a specific for certain mental troubles, and it is believed by certain physicians that so much gold in the mouth tends to produce these troubles. Then we are told that by removing salivary calculi from the teeth they drop out. Again, some physicians say that a fistulous opening should not be cured. These physicians will not allow the dentists to use drugs for curing them, because they claim that it is a condition that nature has established to relieve impurities, and, therefore, the drainage should be allowed to go on. I have heard physicians make this statement. And now, Dr. Andrews says that charges have been brought against oxychloride and oxyphosphate. Well, if all these alleged charges can be sustained,—that amalgam is injurious; that gold is injurious; that the removing of tartar must not be allowed; that in our treatment of abscess we must not attempt to close up a fistulous tract, then "Othello's occupation is gone."

Now, I use amalgam in my practice, discriminately, as I use all other fillings and drugs, and I believe, with the essayist, that no man would be justified in deceiving a patient as to the material he was using because he himself did not believe that material would injure the patient.

To refer to another case of mine in which amalgam fillings figured as the bone of contention: the patient's teeth were badly decayed and I had filled them with cements and gutta-percha until I was thoroughly discouraged, and I suggested to this patient that she allow me to put in amalgam, knowing that her physician was an allopathic physician who would probably not object to the use of amalgam, and she did allow me to do so. She is a woman who abuses herself in following fashionable society, and in the midst of a society season she suffers more or less from stomach trouble and always did, and I have felt that her distress was due to the abuse which she gave herself rather than to any lack of physician's skill to cure her. Not getting relief which she looked for, she broke loose from the allopathic physician and went to a prominent homœopathic physician for medical advice. The first thing he asked was if she had any amalgam fillings in her mouth, and on receiving her reply in the affirmative, he told her she must have them removed at once. She returned to me, and wanted them removed at once, believing them to be the cause of her not gaining her health. I told her that I did not believe the amalgam fillings had any effect whatever upon her health, and that their removal would be simply a matter of more expense and more trouble to her. I removed those fillings and put in cements and gutta-percha again, and she followed the treatment

of the homœopathic physician, but without obtaining the desired relief. Finally, she went back to her allopathic physician, and after a time began to improve. Now, if she had improved in health while under the treatment of that homœopathic physician, she would have alleged that the amalgam fillings were the cause of her keeping in poor health, but in this case, even after the removal of the amalgam fillings, she continued in ill-health.

Speaking of inflamed spots and ulcers, I have seen them caused by ill-fitting rubber plates, and you will see that same inflammation under ill-fitting gold plates.

Dr. Werner.—I feel that every one of us would like to speak on this subject, and it would take a long time to express all our notions and partial knowledge on the subject. Were I to ask the members here if they generally believed that there can be free mercury in an amalgam filling, most would reply, "No." I was of that opinion, but lately I have been convinced that there is free mercury in some amalgam fillings. I have pieces of gold here that touched an amalgam filling and will pass them around. If you believe in homœopathy, you will naturally believe that an amalgam filling that had free mercury would be injurious. I do not wish to ridicule homœopathic methods and principles, but if I were sick, I would not expect much help from a thousandth part of a drop of medicine. I remember an excellent article by Dr. Holmes in the *North American Review*, on the "Fallacies of Homœopathy." It is too early for all truth to be known. Once we did not believe in bacteriology, though I believe some one in Germany, back in Hahnneman's time, did believe in it.

On May 8, 1897, I was filling a right inferior third molar, mesial and crown cavity with gold. In the right inferior second molar, distal and crown, was a large copper amalgam filling which was put in perhaps fifteen years ago, it looked a good deal worn. I had adjusted the rubber dam and matrix, and my assistant was passing the gold into the cavity, and in doing so would pass the gold cylinders over the amalgam filling in the second molar, accidentally touching the amalgam with the gold. Soon I found that my gold filling rocked, and there was noticeable discoloration of the gold after being condensed. I turned to my assistant and asked, "What have you on your foil-carriers?" She replied, "Nothing." I told her it seemed as if she had either iodine or mercury on the foil-carrier, as the gold was loose and discolored, and that we would have to start over again. The foil-carrier was cleaned thoroughly, and I proceeded the second time, but soon found that my filling was again

rocking; the gold cylinders did not cohere. I took it all out again, and have it here in this bottle and would like you to see it. Afterwards, with a clean pair of foil-carriers, I took cylinders of gold and passed them over the amalgam filling in the second molar, and the gold became literally covered with mercury, as you see it in the bottle. Now, that patient is not very sick, and has never, according to my belief, been injured by that amalgam filling and its free mercury. She is more or less dyspeptic, and I have no doubt a homœopathic physician would consider it an excellent case of direct poisoning from amalgam filling.

I believe this presentation of the subject as given to us by the essayist is the most scientific, most logical, of any we have yet heard, —providing you believe in homœopathy.

Dr. Allen.—May I interrupt the gentleman for a moment? I suppose he intends his remarks to refer equally to the allopathic physician who believes that amalgam fillings are injurious, and there are a great many who do.

Dr. Werner.—I doubt very much the scientific basis on which these objections stand at the present day, whether they come from the allopathic or the homœopathic physician. I do not doubt but that they think they find the symptoms the essayist describes, but are they real or imaginary, and are they due to the presence of mercury in the amalgam fillings? That is the question.

As referred to before this evening, there are many people who cannot afford to have gold, nor can they have their teeth patched up with cement or gutta-percha every six or ten months, and hence they are better served with amalgam fillings. In my practice I use perhaps as little amalgam as any man here, for I believe in gold in distinction from amalgam fillings, and my patients think the same. I might perhaps attack the essayist stronger yet, although I think he sincerely believes what he has told us.

Dr. Taft.—Do not be afraid, doctor; I want to hear whatever you think about this subject.

Dr. Piper.—One point in Dr. Barker's remarks recalled to my mind something that happened a short time ago. A young lady was suffering from some trouble, and the gentleman to whom she was engaged advised her to go to his physician, a prominent practitioner not far from Copley Square. One of the first things he asked her was, "Have you any amalgam fillings in your mouth?" She replied that she thought she had, and he told her to go to Dr. —— and have them removed. She asked why she could not go to her own dentist. "Because," he said, "I am afraid if you should

go back to your own dentist, he would tell you that he did not think it was necessary to remove these fillings, and advise you against it." She became indignant, and told him that she had confidence in the ability of her own dentist to take care of her teeth, and declined to go to the other man. She came to me and told me the facts and said, "I want you to go down and talk with him, and find out, if you can, why it is necessary to have those fillings removed." So I made an appointment, and early one morning went down to his office. I talked nearly an hour and a half to this man on the subject, and about all that I could get from him that I could understand was that the trouble was caused by the "dynamic effect." It did not seem to be due to absorption of the mercury into the system. We all know what dynamics are, but what the meaning of the dynamic effect of amalgam fillings in the mouth is I do not know, and I could not get any satisfactory explanation from him. I would like to ask Dr. Taft if he can make it clear to us.

Dr. Eddy.—The only point I would speak upon is in regard to the value of medical opinions. We have two cases in the Rhode Island courts involving this question. In a case of suspected diphtheria the physicians for the patient claimed that there was no diphtheria, while the representative of the State Board of Health said there was diphtheria. Both judgments were given on evidence of the examination of cultures. The house was placarded, and, as a consequence, suit was brought against the board of health for restricting the liberties of the occupants. So I do not know whether we are right or wrong in following physicians' advice in certain cases.

Dr. Briggs.—I am sorry I did not arrive in time to hear the paper. I do not know whether the essayist made this a homœopathic issue or not. If he did, I do not care to discuss it. Or, if he laid down the law that the mercury of amalgam fillings, as a rule, was injurious, I do not think that is a discussable point with the material we have at our disposal. On the other hand, it seems to me that if the question he has brought before us is, "Can amalgam fillings injure a person?" I think that is open to discussion, and I am not prepared to say that they do not. Any one who has had any experience with drugs, foods, or medicines of any sort knows the possibility of meeting with idiosyncrasies which may exist at certain times in some individuals, and at all times in other individuals. We know that there are persons to whom gold would be irritant poison; we know that all the metals are severe poisons in excess of the therapeutic dose, and that an individual could not be found here

and there who would be affected by the different metals that we use I would not attempt to say. But then comes the question, "Why is it that mercury is selected as a scape-goat?" It seems to me from the cases that I have observed, where I have admitted to myself the possibility that amalgam fillings were injuring a person, that the irritation, the possible danger of poisoning, came quite as much from the metals contained in these amalgam fillings as from the mercury. This has led me to feel, in my practice, that a properly made, properly put in amalgam filling was not dangerous; whereas, I have taken out amalgam fillings that looked to me as though they might be dangerous. When you see a filling that is constantly and steadily losing substance, you know that the ingredients are going into the patient, and if it happens to be one of those few patients who are peculiarly susceptible, it may be doing harm. I have taken out such fillings.

I think if this thing is going to be discussed, we must discuss it from all its points and not confine ourselves to the mercury. I have removed most of the copper amalgam fillings that I have put in, but in those cases where I used the high grade alloys, properly mixed, and properly put in, I have yet to see any case where there was any sign of trouble or any cause for their removal.

I remember the case of one patient who had a sore throat and consulted a homœopathic physician, who told her the usual story that nothing could be done until the amalgam fillings were removed. I told her what I thought, but at the same time said I would be very glad to take them out if she wanted to undergo the necessary trouble and expense. I told her that in all the amalgam fillings in her mouth I could see no signs of danger from any except possibly one copper amalgam filling which had lost half its substance, and if she were susceptible to the poison of mercury or to the poison of copper, that was undoubtedly the one which was causing the mischief, and I would be very glad to remove that one and see what the result would be. I did that, and she reported after a while that her throat was very much improved, and later she came to me again and said that she wanted the rest of them removed. I removed them and put in gold fillings, but there was never any further improvement in her case. We must admit, of course, as scientists, the existence of these idiosyncrasies, but if you are going to begin to discard materials because of idiosyncrasies, you must discard your gold and also the phosphates. Fill your teeth with intelligence and judgment, and watch your cases, and if there is trouble, look to see what the trouble is, and if you have reason to

think it is caused by amalgam fillings, remove them, but I do not think it is necessary to go into an absolute condemnation of amalgam. I have not, and I shall not.

Dr. Potter.—We learn from experience that physicians know very little about the teeth and the affections thereof, and hence a prevailing scepticism as to their opinions upon dental matters. When they show us that they have studied the teeth and know them well, I think we will be able to place more confidence in what they have to say about amalgam fillings and rubber plates. I agree with what Dr. Briggs has said as to the possibilities of harmful results from the use of amalgam.

Dr. Barker.—I want to get some information if I can. We want to discuss this question with a view to forming opinions. Will the essayist or will any one tell me on just what ground the belief is based that amalgam fillings are injurious; is it upon the ground that free mercury passes from the filling into the system? As supporting that view is the illustration of Dr. Werner, but with all deference to his statement, it seems to me there must have been some mistake, and there must have been some other cause for his filling "rocking" which he did not understand. Suppose I have an amalgam filling that has been in the mouth for ten years and presents a good, clean, nicely polished surface, how many dentists here present, how many members of this Academy, would hesitate to put gold right into that amalgam filling supposing it to be dry? I would not. My confidence might be misplaced, but I should not have any expectation that free mercury would pass from that amalgam filling into the gold. If my filling "rocked," I would not believe it was because of having absorbed free mercury, but from some other cause. I believe an amalgam filling becomes crystallized, and that no free mercury passes out of that filling either into the stomach of the patient or any where else.

Dr. Taft.—I will answer Dr. Barker's question by asking him another. I do not pretend to *know* or to be able to explain to the satisfaction of every gentleman in this room just what the dynamic influence or action of a drug is. To my mind it is a force of some kind,—an invisible, spirit-like force. Now what is it that constitutes the difference between a live man and a dead one? Is it not the presence or absence of what we call the *vital force?* When a physician is treating a sick man, he finds a condition where the vital force is at a low point, and he attempts to restore it by the use of drugs, or, I should say, by means of their *dynamic* force. Does he expect that, unless they possess some inherent

force, the drugs are going to have the slightest effect upon the material organs or tissues of the body? If that is the case why cannot he successfully treat or resuscitate a dead man with the proper medicines?

In regard to the dynamic influence, therefore, I cannot tell you beyond this what it is, but I would like some one to explain to me why it happens that some persons cannot pass near a bed of poison ivy without becoming badly poisoned. Is there any "free" ivy which gets into the system? If not, is there anything in the force or energy emanating from that poisonous plant that we can see, measure, feel, taste, weigh, or smell?

It has been asked, Is there any free mercury going off from an amalgam filling into a person's system? I am not prepared to say that there is, but I would like to ask any gentleman here who has had occasion to take off a gold band surrounding a tooth that had been filled with amalgam, if, when he removed the cap, he examined that gold band? I have had occasion to do it, and have found the gold band perfectly rotten clear through. I have found that gold caps where they come in close contact with an amalgam filling will present a worm-eaten appearance. But who shall say whether this is due to free mercury, the vapor of mercury, or to some other cause? There are lots of things of which we cannot explain the why or wherefore.

We must reason inductively. We observe certain facts; and from continual observations we come to establish general principles; after these principles are established, we bring them down and apply them to particular cases. Now, in the case of the gentleman who cannot be in a room where there is an uncorked bottle of the bichloride of mercury without developing a severe headache, what is it that causes that headache? Is it free mercury that is going into his system, or is it the *dynamic effect* of the mercury upon that person's vital force? The gentleman does not attribute it to his imagination, because when the bottle is removed the headache, sooner or later, disappears.

How do we explain the cessation of chronic headache after the removal of amalgam fillings? I have seen such headaches entirely cured after I had faithfully taken out every particle of amalgam. Perhaps some member can offer an explanation. I think the Academy has approached and discussed this subject in a very fair-minded way, and with a desire to get at the truth, and I feel that the evening has been a profitable one to us all.

Dr. Eames.—Will Dr. Taft please inform the Academy in regard

to the proportion of individuals who are thus affected by mercury.

Dr. Taft.—I do not find that it is a large number. I meant to convey that idea in my paper. I simply wanted to say that I believe a susceptibility to mercury may be established at any time. Mercurial or other abnormal symptoms may appear at any time in a person who has never exhibited them before. That is true of ivy, arsenic, or other harmful influences. We may not be susceptible to-day to the toxic effect of these poisons, but it may happen that to-morrow or next week we will be.

In this connection, I remember a point that I wanted to speak of, a remark made by a chemist who was in my office not long ago. In mixing an amalgam filling, I allowed some of the mercury, in squeezing the mixture, to drop on the carpet, and he asked, "Do you not think that is rather a risky thing to do?" Asking him for the reason why, he replied, "When mercury becomes very finely divided into such a number of minute particles as have fallen on the floor it takes but a moment for the vapor to fill a room like this at the proper temperature, and this vapor is poisonous. Where these globules are gathered together, making one large globule, the volume of vapor would of course be greatly diminished."

Dr. Eames.—I would like to ask Dr. Taft what he believes to be the *modus operandi* of the poisonous action of mercury? Is it a dynamic action?

Dr. Taft.—There is an influence there, whether it is the dynamic influence or not. I do not see why it should not be.

Dr. Eames.—As I understand it, Dr. Taft does not claim that he can explain whether a minute quantity of mercury is absorbed by the system and produces this effect, or whether it is a dynamic action.

Physicians of the homœopathic school are divided on this point; some of them do not believe at all in this dynamic force. I have been endeavoring to get an acquaintance of mine, a homœopathic physician, to come here this evening. He believes sincerely in the theory of the dynamic action of drugs,—that it is the mere presence of mercury which produces untoward effects, and not free mercury getting into the system, but he did not think it wise to come and state his opinions. He said, "At present we are not prepared to show how this is, but we believe that later we can show some scientific reasons why this is so, and give the proportion of cases thus acted upon in the observation of a certain number."

As I understand it, the proportion is acknowledged to be small,

and it does seem unreasonable to abandon the use of amalgam altogether just because of the possibility of danger in rare cases.

The cases of strawberry-poisoning, of which Dr. Taft speaks, are properly termed idiosyncrasies. I know a man who cannot eat a dry cracker without having an area of about an inch square break out into perspiration on his left cheek. A young lady cannot eat eggs without vomiting. A school-teacher cannot take a teaspoonful of honey without his neck swelling to such an extent as to cause great difficulty of breathing, and causing the most distressing symptoms. I have heard of several persons in whom opium produces catharsis instead of constipation. Sometimes nitrous oxide cannot be inhaled, while ether may be taken with impunity. I know of an instance in which ipecac, being compounded in the third story of a house, affected a person on the first story. I know of a lady in this city who sold a horse because she could not ride behind him without being affected with asthma; and a patient of mine has the same trouble with regard to dogs,—he cannot have one without being affected with asthma. In all these cases there is a peculiar condition of the system by which food, drink, or medicines act in a peculiar manner, and those proportionately few cases of idiosyncrasies should not affect our general use of a material or drug which we know to be beneficial in the vast majority of cases.

A word in reference to the action of mercury upon gold. I could not help thinking of the beautiful work which we see in combination fillings as shown us by Dr. Clapp. In some cases the cavity is nearly filled with amalgam, and then gold is packed in to finish the filling, and yet it does not injure it. I agree with Dr. Barker that I should not hesitate to put gold in combination with amalgam where I thought the case would be better served by so doing.

Dr. Taft.—I would like to ask if any one of the members have noticed little holes in gold bands, whether upon a tooth which is filled with amalgam, or in gold caps which are in close proximity to an amalgam filling?

Dr. Briggs.—I was going to speak on that very point, because I took one off last week that I placed on ten years ago, and in that case the tooth was filled with amalgam. The tooth had decayed still more, and I took off the band and placed on a gold crown, but there was no trouble with the band,—it was just as hard as the day it was put on. I might say that I have repaired little places in gold caps with alloy, and in such cases, and, in fact, in all cases, I always like to use a high grade alloy. I do not see anything remarkable in the cases which Dr. Taft has cited where persons have been cured

after the removal of amalgam fillings, but his reasoning is a little specious when he attempts to deduce from them that we should not use amalgam. We know that drugs are volatile; many of them are exceedingly so, and some of them are liable to affect certain persons by their mere presence. This is a fact with the ivy-poison. I know a physician who cannot handle an uncorked bottle of rhus tox. without getting all the effects of ivy-poisoning, but that simply shows his idiosyncrasy. He uses this drug for his patients whenever it is indicated.

How many of us see cases of ulcerated sore throats? I do not recall more than a very few in twenty years' practice, and in the worst one I ever saw there was not an amalgam filling in the mouth, but there were some abominable gold fillings. I took them out and replaced them with proper gold fillings, and the ulcerations disappeared. It would have been a characteristic mercury mouth if there had been amalgam in the teeth. Another case was that of a very sensitive patient, for whom I had placed in a bridge. She had not permitted me to grind the crowns down as much as I wished to, and she afterwards came to me with a very sore throat. The removal of the bridge and placing her teeth in good order cured the sore throat. On the other hand, I remember the case of a lady who was sent to me to have her amalgam fillings removed, because she constantly suffered from headaches and her physician could not effect a cure. I took out all the fillings and replaced with other materials, and she still suffers with headaches.

Dr. Taft.—I would like to ask Dr. Briggs in how large a percentage of patients of mine who have come to him to have amalgam fillings removed has he noticed this dissolving away of copper amalgam fillings that I had inserted?

Dr. Briggs.—I did not mean to intimate that there were a great number of them, but in the few cases that I have seen, I thought it better to remove them because they had shown this wearing away. It occurred to me that if they were dissolving, the patient ought not to be swallowing copper.

Dr. Taft.—How extensive was the dissolution in those that you did remove?

Dr. Briggs.—I should say all the way from an eighth to a third.

Dr. Taft.—I want to say, Mr. President, that I see a considerable number of my former patients, and if it were not for my convictions with regard to mercury, I should say that I can see not the slightest reason for discarding the use of copper amalgam. The fillings that I put in ten years ago I find to-day to be in abso-

lutely perfect condition, and, furthermore, preserving the teeth perfectly, and I can recall to mind but two cases where I have seen any marked dissolution of copper amalgam fillings that I have inserted. The reason I asked about this dissolution was because I think there are some of our members who were present at a meeting of the Harvard Odontological Society a few years ago, where Dr. Briggs spoke of my having left behind me, upon my removal to Chicago, a great many cases where I had inserted copper amalgam fillings. He is on record as stating (see February, 1894, issue of the INTERNATIONAL DENTAL JOURNAL, p. 119) "that it had been his privilege to see some of those fillings, and that he could testify that I seemed to have done some great work in preserving teeth by the methods I had followed."

Dr. Briggs.—I took one out only a month ago that had been gradually disappearing ever since it first came to my notice.

Dr. Taft.—I have never been obliged to remove a copper amalgam filling that I have put in for the reason that it showed this dissolution which so many complain of; but I am continually taking out alloys of tin and silver for the reason that the teeth are so manifestly going to pieces under these fillings. In most mouths, I am free to say, the amalgam fillings are a disgrace to whoever put them in. They show a shrinkage or contraction of the metal about the margin, and on removing the filling you will find the cavity is generally twice as large as it was when the filling was placed in; but I have yet to see a copper amalgam filling that I myself have placed in where there has been any such shrinkage or contraction. They are all as hard as flint. Copper amalgams seem to throw out something like tendrils into the tubuli of the dentine, and in order to remove one you have to cut and scrape until you get down to the very thinnest layer. It adheres like cement to the walls of the cavity,—even more firmly.

Dr. Andrews.—Is it not true that there is more mercury in a copper amalgam than in the other alloys?

Dr. Taft.—Not if you squeeze the mixture very dry to get out all the mercury possible. It takes them about a day to set, when they are placed in as dry as you can get them. If the mixture is inserted in a very plastic condition it will set in about fifteen minutes, and I hope if you decide to use copper amalgam to any extent that you will be sure to remove all the mercury that you can, and you will find that they will then be very much more durable.

Dr. Briggs.—If the essayist would start a crusade against those men who put in amalgam fillings so carelessly, make improper

preparations, and do slovenly work, why, I am hand and glove with him. That is what has cast the odium on amalgam fillings. Many dentists seem to think that when placing in amalgam anything will do in the way of preparing the cavity. I do not see any reason why you should not prepare the tooth as well as you would for gold. I do not say that I always do that myself, but I am doing better every day.

Dr. Maxfield.—There is one thing I would refer to. I dislike very much to have the impression go out from this society, as it may when the proceedings are published, that amalgam fillings are used simply because the patient cannot afford to pay for gold. It seems to me we should use amalgam, gold, gutta-percha, or any other filling, because they are the best things to use in the particular case which we have at hand. I believe, in the majority of cases where we use it, amalgam is better for the patient than a gold filling. I do not believe in subjecting the patient to four or five hours in the chair when I can do practically as much good by inserting an amalgam filling in less than an hour.

In the matter of free mercury, spoken of by Dr. Werner, he has not given us any scientific basis for his belief that the mercury separates itself from the rest of the filling. From a chemical point of view we have reason to believe that there is too strong an affinity between the mercury and the alloy to admit of this taking place. In answer to Dr. Andrews's question, I believe there is more mercury in copper amalgam than there is in other alloys. A great fault with copper amalgam is in its manufacture. I became quite interested in copper amalgam through a paper which was read by Dr. Wegant some ten or twelve years ago, and in my study of the subject I found there was a trick in the manufacture in order to produce the desired result. It is the practice of the manufacturers to express the mercury from the copper amalgam by hydraulic pressure, and after doing this, when offering it for sale, if it was not plastic enough, they simply advised adding more mercury to it.

We know that by hammering an amalgam filling during its insertion it will express the mercury, and undoubtedly the pressure which we use in inserting the filling will cause the minute particles of mercury to penetrate the tubuli, as Dr. Andrews has stated.

I cannot understand what Dr. Briggs refers to when he speaks of the "high grade" alloys. According to Dr. Black's experiments, the best amalgam consists of silver, tin, and copper. Gold is a detriment to amalgam, and is simply put in to bring up the expense, and, being more expensive, many dentists infer that it must be better

to use. It simply shows their ignorance of the necessary qualities of an amalgam.

I may say a little in the way of criticism of the essay. The writer has not given us any proof that the ill effect which he describes can be positively traced to mercury. We get the same effects from the poison of other metals; we get it from lead; we get it from copper. We know that mercury is often adulterated with lead, and in view of all this, in cases where there is an idiosyncrasy, the poisoning could result from copper and lead as well as from mercury, and we have not yet heard any evidence that such is not the case. Now, I have had a number of these symptoms that Dr. Taft has spoken of resulting from other causes to which I could trace them. I have seen these inflamed throats and mouths in cases where the patient was suffering from stomach trouble; seen them in mouths where there were no amalgam fillings whatever. I have one patient who presents these symptoms occasionally, and the use of trichloracetic acid cures it at once.

Dr. Smith.—My excuse for speaking again is because I wish to correct a statement of the last speaker that we did not want to have it go out from this Academy that we used amalgam on account of its cheapness. This Academy desires the facts to go forth, and I repeat that it is a very important fact, which we wish every one to know, that if the bill now pending before the Legislature, or soon to be brought before it, should pass, it would work a hardship to poor people, and we are willing to admit that in many cases we do use amalgam fillings on account of the expense to the patient. To cite a case: Suppose we have a patient whom we know to be very, very poor, and we have a large buccal cavity to fill for that patient. The patient cannot afford to pay for the time which it will require to put in a gold filling, and there are only two things to do,—fill the cavity entirely with cement, or entirely with amalgam. Now, there is no doubt that if the patient was to be deprived of the benefits of amalgam in that case, it would be a hardship, and we know that there are many, many such cases.

THE regular monthly meeting of the American Academy of Dental Science was held at Young's Hotel, Wednesday evening, February 2, 1898, at six o'clock.

A paper was read by Henry H. Burchard, M.D., D.D.S.

SOME REFLEX DISORDERS OF DENTAL ORIGIN.

BY HENRY H. BURCHARD, M.D., D.D.S., PHILADELPHIA.

Reflex disorders of dental origin cover a wide field in both sensory and motor disturbances throughout the body, varying in latitude from pain referred from one tooth to a neighboring tooth, to referred pain in a limb terminal, from slight twitching of near muscles, to pronounced epileptiform seizures or paralysis. It is impossible in the limits of a small essay to consider all of the manifestations of nervous disturbance having their origin in dental diseases; nor, indeed, is it advisable to do so, as many of the cases are but rare clinical curiosities. There are, however, features of some degree of constancy which have occupied the attention of nearly every dental practitioner. These are the reflex disturbances arising from diseases of the pulp. Many of the cases of reflex disorders recorded in literature are difficult of classification, because reported by the medical practitioner, who, so far as I have been able to determine, has never differentiated diseases of the pulp from those of the pericementum. Reflex pains do occur in connection with diseases of the pericementum, but by far the greatest number of cases are found associated with diseases of the pulp. The reason for this is fully and clearly set forth by Dr. Black in Volume I. of "The American System of Dentistry."

The pulp in its normal condition does not possess the tactile sense, and, like similar organs, refers irritation to which it is subjected to some other point.

Such organs, however, do exhibit some degree of constancy as to the point of reference. For example, as pointed out by Black, affections of the iris have an almost constant point of reference to the brow, those of the hip-joint to the inside of the knee, and so on.

This same constancy is observed in connection with the vast majority of acute pulp-diseases; the pain, being rarely localized in the affected tooth (except in cases of acute and sthenic pulpitis), is referred to some point or points of the corresponding nerve-trunk of the same side, the general rule being that the affections of the

pulps of the lower teeth have pain reflected to some point of the course of the inferior maxillary nerve, frequently in the auriculo-temporal branch. Pulp-diseases of the upper teeth are most commonly attended by pain in some point of the superior maxillary nerve.

In connection with either, pain may be referred to the first branch of the fifth nerve; this latter reflection is to be regarded as the first of the remote references.

The next reference is to the ear, where not only sensory disturbances may be noted, but also those of special sense. Next in point of frequency are affections of the eye. While many of these are clearly traceable to reflex disturbance of the ciliary ganglion, there are others in which the second cranial nerve is involved. That is to say, while pain is usually confined to the ramifications of the fifth nerve, it may be referred to other nerves whose function is then disturbed; to the second, resulting in functional diseases of the retina; to the third, fourth, sixth, and seventh, in which cases motor disturbances of the muscles about the eye and head are noted; to the eighth, producing disorders of hearing; to the ninth and tenth, when disorders of the tongue, pharynx, larynx, and other parts may be noted, as recorded in dental literature.[1]

The spinal nerves may be affected, resulting in painful diseases of distant parts,—the uterus, a thumb, or even a toe. In addition to these should be mentioned the functional disorders of the cerebrum itself, cases of which have been recorded.

To generalize: The acute affections of the pulp are those in which wide reflex disorders are rare. In the chronic diseases, notably in connection with chronic degenerative changes, reflex disorders are common; and *vice versa* in diagnosis; localized pains about the jaws point to the more acute diseases of the pulp; distant pains arouse suspicion of chronic diseases of the organ.

The dental diseases to which such pains are traceable may, for convenience, be grouped under four heads,—1. Reflex disorders due to the irritation of the hypersensitivity of dentine. 2. Those associated with acute pulp-diseases. 3. Those arising during the progress of chronic pulp-diseases. 4. Reflex disorders due to diseases of the pericementum.

While it is certain that almost any of these dental causes may be associated with almost any extent of nervous transferrence, it is

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[1] Brubaker, American System of Dentistry, vol. iii.; Lauder Brunton, Proceedings of the Odontological Society of Great Britain, 1880.

extremely probable that pains may be and often are ascribed to a dental source where their true origin lies in other organs. The teeth may be the seat as well as the source of reflex pains. This is notably true in patients who suffer from chronic malarial poisoning, from gout, and in some cases from secondary syphilis. In the gout cases, however, it is more than probable that pathological conditions exist in and about the teeth to which general dental pains are due.

The test of a dental origin of a distant pain should be, Does the pain disappear promptly upon the correction of the dental disease without any other treatment? The vast majority of localized pains about the head and face are due to diseases of the eyes and teeth. Those of the eyes are most frequently located in the first division of the fifth nerve, and, as stated, those of the teeth in the second and third branches. These rules are open to many exceptions, but serve as directing signs in the location of the causes of facial and cranial pains.

REFLEX DISORDERS DUE TO EXPOSED DENTINE.

As a general proposition, it may be stated that reflex disorders due to the irritation of hypersensitive dentine are most frequently associated with its peripheral exposure; furthermore, the most common situations of the points of irritation are upon the necks of the teeth, where a limited amount of cementum has become exposed and removed, laying bare the dentine. This rule is also open to wide exceptions, but is a useful guide. Other situations which should be mentioned are upon abraded surfaces of teeth and in superficial cavities. As in all dental disorders, the extent of the reflexes is governed by peculiarities of the individual, being most pronounced and remote in individuals who present a neuralgic dyscrasia. In the ordinary individual, such a condition as a neck-exposure of dentine may give rise to indefinitely locating pains about the lips or jaws, in the neuralgic dentine, exposure at the neck of one tooth may be the cause of severe trigeminal neuralgia, with painful spots at the points of nerve emergence, the supra-orbital, infraorbital, and mental foramina; severe pain in the eye or in the ear. Cases are recorded when typical neuralgic sore areas have existed and resisted general medication, and been found due to exposed dentine at the neck of a tooth. This exposure may be upon any tooth; more than once it has been located upon the disto-cervical portion of a third molar.

In some of these cases deliberate irritation of the exposed dentine may cause a reflex paroxysm, but, unfortunately for purposes

of immediate diagnosis, it more frequently happens that the pain induced is local. However, a casual relationship is made clear when it is noted that the reflex pain disappears soon after a thorough cauterization of the exposed dentine.

A diagnostic sign of the condition is the recurrence of pain upon taking faintly acid or intensely sweet substances into the mouth.

ACUTE DISEASES OF THE PULP.

While it is true that severe and wide reflex pains may be caused by acute hyperæmia and attacks of acute inflammation of the dental pulp, it is rare in these affections that symptoms directly referred to the maxillary region are absent.

In the first-named disorder the taking of cold water in the mouth is almost immediately followed by a paroxysm of pain, usually definitely located in the region of the posterior, middle, or anterior dental nerves. In acute pulpitis the pains are also directly referred to the maxillary region, although a defined sore spot may present as a reflex at some portion of the face or scalp, in which event the existence of a dental disease may not be even suspected.

It is in connection with repeated venous congestion of the pulp, its chronic inflammation, suppurative and non-suppurative, and still more frequently with the formation of defined calcific masses in the pulp-tissues, that wide reflex disorders are most frequently found.

All of these conditions present one common feature which differentiates them in symptomatology from the acute affections of the pulp,—*i.e.*, a lessening instead of an exaltation of the special temperature sense of the pulp. Black has remarked this in his contributions to the "American System of Dentistry," and it will be found almost constant. The reaction develops a special peculiarity, notably in the later stages of some of these degenerations, and that is a lessening of response to cold application and an increasing response to heat.

The nature and time of response to heat affords a valuable diagnostic sign as to the pathological condition of the pulp. It is most marked in abscess of the pulp, less so in venous hyperæmia, and much delayed in extensive calcifications in the pulp substance. These distinctions may be carried to still further differentiations, but are beyond the scope of the present paper.

The vast majority of the common neuralgias, with defined painful areas about the head, are due to one of these dental disorders. Pain in front of the ear, in the ear, pain over or in the eye, with a

disposition to press upon the eyeball, tender spots in the occipital region, or in most of the cases of pain at the points of nerve-emergence, all point to a reflex disorder having a dental origin.

In nearly all of these cases pain is unilateral. Should it be found upon both sides of the head, it leads to the suspicion of teeth on the other side being affected or to the existence of some optical defect, notably uncorrected astigmatism, hyperopia, or myopia.

Much confusion may arise through the existence of both dental disorders and optical defects, so that the general injunction of the ophthalmologist to patients, "Have your teeth examined," is reciprocal. The dentist should advise in neuralgic cases, "Have your eyes examined," but should correct or remove all dental disorders to which reflex neuralgias are attributable.

Reflex cranial and other neuralgias are also associated with diseases of the pericementum; the classes of pericemental affections giving rise to them are both septic and non-septic. As with pulp-diseases, reflex neuralgias are most commonly due to chronic rather than acute pericemental diseases. Of the non-septic cases, a hypertrophy of cementum has been found a frequent cause of some of the most remote cases of reflex neuralgia recorded in medical and dental literature.

As with nodular deposits in the pulp, these growths exist frequently, and give rise to no symptoms whatever; presumably, the reason for reflex irritation when it appears is the pressure of the hypertrophic growth upon nerve fibres. Many of these cases are not diagnosed except by a long and tedious process of exclusion, there being frequently no local symptoms which would point to the existence of the dental condition. At the present day, suspected cases would, of course, be unveiled through a radiograph.

Many reflex neuralgias are directly traceable to the existence of septic conditions about the roots of teeth, the proof of the casual association being brought to light by the disappearance of the reflex disturbance when the septic condition about the root is remedied or the tooth is extracted. Indeed, it is extremely probable that a large class of ill-defined disorders might be traced to this source, the lack of continuity and clearness of histories, dental and otherwise, obscuring the connection between dental and other diseases.

This subject might be expanded into a large monograph, even more extensive than Brubaker's admirable contribution to the "American System of Dentistry." Enough, however, has been

said to emphasize the direct and indirect importance of dental health and to furnish material for an evening's discussion.

DISCUSSION.

Dr. Brackett.—With such names on the programme as those of Drs. Jack, Kirk, Stellwagen, and Eames, I thought that any part which I might be called on to take in the discussion of this paper would be small, and would come after the others; but with the circumstances as they are, I consider it a privilege to begin the discussion, to state my appreciation of the paper itself, and to express my gratification that the conclusions, in most particulars, at which the writer arrives are quite in accord with what my own experience has been. I will quote two or three illustrative cases.

It is a fact that there come under the observation of the practitioner of dentistry, not very rarely, cases requiring great care and skill in diagnosis, and a capacity to practically apply such teachings as are impressed in this paper. There came to me about eleven o'clock in the forenoon of a day more than twenty years ago a gentleman of superior mental ability. He had been under the care of his medical adviser for two weeks for the treatment of neuralgia, located directly in the occiput. He had suffered extremely, and had been confined to his room for a considerable portion of the time, utterly incapacitated for giving attention to the practical affairs of life.

His medical adviser had suggested, everything else having failed to relieve him, that he came to me to have his teeth examined. On the right side of the lower jaw I found in the third molar an immense corono-buccal cavity, containing within a very broadly exposed, congested, and greatly irritated pulp. I said that I believed that was the occasion of his suffering. This seemed to him preposterous, but, when I explained how the nerves of the face and head could be affected by an irritated pulp, he said he would think about it. He went home and thought about it, and about two o'clock the next morning he came back. Gas was administered and the tooth was removed. When he had recovered from the effect of the anæsthetic his neuralgia was gone and there has been no return. That case is typical of numerous ones. Indeed, we usually find that patients coming into our offices with the statement that they have been having neuralgia have really been suffering from toothache.

Another case which I will mention was one in which there has been for years extreme general hypersensitiveness of the teeth.

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Owing pretty certainly to a lack of good capacity for digestion, there is a rather prevalent acidity in the oral cavity, with a tendency of the teeth to decay all about the necks, an extreme sensitiveness to touch of an instrument, and an incapacity to eat acid fruits. Considerable suffering has been manifested in numerous instances after the insertion of a metallic filling of any sort.

Two or three years ago I filled with amalgam an extremely sensitive cervical cavity in a right lower second molar. There had been suffering previous to the operation, but no exposure of the pulp. After the operation, in addition to the hypersensitiveness of the dentine, there was what appeared to be earache, starting in the ear itself. It was so severe that at the end of twenty-four hours I said that the patient should come to Boston and try to secure the best advice that could be had with reference to the ear. She came and saw first Dr. Clapp, and was by him introduced to Dr. Blake, who made a most careful examination of the ear, and could make no other report than that he found everything normal. This satisfied me that the extreme sensitiveness of the dentine was the sum total of the cause of the suffering, which gradually lessened and disappeared entirely within a week or two.

There is a saying, worthy of being heeded, that "the man who is his own lawyer has a fool for a client." Sometimes a dentist, notwithstanding scores and hundreds of experiences to the contrary, thinks, if he is the patient, the patient knows which tooth is aching.

A few years ago I had, as I supposed, pain in a left upper molar. I hastily rushed to a brother dentist, and, without giving him the opportunity to make an examination, I asked him to make an application to the left upper molar, which relieved me for a time; but in a few days the pain came again, and I had another application made; and that continued for about six weeks, when my good friend suggested that he make an examination of the other teeth in my mouth. On doing so he found an exposed pulp in the left lower second molar, which had been the real seat of the trouble. I had not capacity enough to make out in that length of time where the pain was located.

It should not be forgotten, in our examination and in our dealing with cases as they come to us for the relief of pain, that the patient's statements, while they should be listened to and accepted as helpful, are not usually to be looked upon as of so much value as the results of our own investigation. In the matter of extraction, patients often come to our chairs with the statement that a

particular tooth is the seat of pain. If we extract that tooth without demonstrating to our own satisfaction that it is the cause of the trouble, a very material percentage of cases of mistake will occur. It has sometimes seemed to me that twenty-five per cent. of error would be made through operating with the patient's testimony alone as the guide. These chances for error come through two or more channels. One of these is the well-recognized tendency of a nerve, under certain circumstances, to refer to the peripheral distribution the consequences of an irritation which is applied anywhere along the course of the nerve. The result of this is that an irritation which is taking place in a third molar seems to the patient to be located perhaps in the cuspid. We shall find numerous illustrations of this tendency if we look for them, so that I have made it a custom not to extract a tooth near the front of the mouth until I have satisfied myself about the conditions farther back. As a rule, unless a tooth shows unmistakable signs that it is the source of the patient's trouble, such as the presence of pericementitis, or alveolar abscess, or a glaringly exposed pulp, I look also on the opposite jaw, being influenced by such conditions as I have suggested, and because there are many cases in which the occlusion of even a single tooth is of very great consequence. Another reason why we should not depend entirely upon the words of the people who come to us to be relieved of pain is that their statements are not always ingenuous.

It was my privilege several years ago to have referred to me for dental treatment a good many patients of one of the most eminent practitioners of gynæcology of New England, now for some years out of practice. It was one of the cardinal principles of this specialist's practice to insist on the mouth being put in order, if the patient's condition would permit it, previous to his treatment of the pelvic organs or coincidently with that treatment. He recognized the possibility of harmful effects to the pelvic organs through the reflex action of any irritation which might affect the delicate nerve-filaments that are within the dentist's province.

If we were to allow, for an instant only, discussion of the converse of this paper,—of how disturbances in other regions may react most unfavorably upon the teeth,—I should have emphatic testimony to present. There comes to my mind another maxim of the specialist to whom I have just alluded,—that all surgical operations are most advantageously performed after the conclusion of the menstrual period. Not only operations within the gynæcologist's special surgery, but operations in general surgery as well, are most

hopefully and helpfully accomplished during what Dr. Storer denominated the menstrual ebb. A case to which I wish to refer was that of a patient who came to me with trouble with the upper jaw. She was in a low systemic condition and very nervous. Examination showed a cavity in a left upper third molar. It was the only tooth in that region having a cavity, and the cavity was very small, almost literally a pinhead cavity. It was extremely sensitive, so much so that the drying of the cavity with bibulous paper caused greater shrinking than is usual if an instrument is put into the pulp-tissue. Although I had been conversant with the increased sensitiveness of the female nervous system at certain times, this impressed me as the most extreme instance I had ever known. She made it plain to me that she was then "unwell." I told her that if we could devise some palliative treatment for the time, after a while we could get on better with the excavation and filling of the cavity. There was put into the cavity deliquesced carbolic acid, and no further attempt was made to excavate until after menstruation had ceased. She was then feeling very much better systemically, and the preparation of the cavity was practically painless. I attribute the great change partly to the effect of the deliquesced carbolic acid, but more to the different systemic conditions of the patient.

In one of the opening sentences of the paper there is a reference to epilepsy, and the suggestion of the possibility of the disease being aggravated by the presence of an abnormal condition of the teeth. Very shortly after my graduation, I was consulted by a young man, perhaps twenty years of age, who was subject to epilepsy, and I was asked if I thought the teeth had anything to do with it. The right upper cuspid had never appeared. I was able, by diligent search, to locate it, deeply embedded at an angle of about forty-five degrees from the position it should have occupied, and with no room in the oral cavity for its eruption. In that case I had no opportunity to operate, but I believe that the impacted tooth was at least an aggravation of the trouble from which he suffered.

One of the points in the paper which specially interested me was in regard to the employment of different degrees of temperature in the diagnosis of obscure cases. Heat is of very great value as a test for diseased pulp tending to die in a confined space,—that is, in a chamber that is not perforated by open caries. In a case of sharp pain with intermissions the application of heat, causing marked increase of pain, may be the means of locating the seat of the trouble and indicating the treatment to be pursued.

A very satisfactory means of applying the heat-test is by using mineral talc, or French chalk, similar to that which the tailor uses for marking cloth. A piece of the material is easily cut into a convenient shape for carrying in a port-polisher so as to reach any tooth. It readily absorbs the heat of an alcohol lamp, may be heated hundreds of times, and does not corrode.

I agree cordially with the expression in the paper that calcifications within the pulp are not frequent causes of disturbances. I remember that our worthy president, some years ago, gave us a very interesting illustrative paper with reference to the very great frequency of these calcifications in the pulp-chamber. I believe that in some thousands of extracted teeth which he opened he found these calcifications present in about twenty per cent. The teeth were a miscellaneous collection, extracted for all reasons, and the showing appears to be that calcifications in pulp-tissue are much more frequent than is trouble from them.

In this connection a most important matter has not had mention,—that is, that in quite a percentage of true neuralgic affections the circumstance of nutrition is one of great consequence. I have seen a half-dozen cases, perhaps, of obscure, intractable neuralgia in elderly people in limited circumstances, poorly nourished, insufficiently clothed, not well housed, living in an unfavorable environment, perhaps overworked, in which I believed the affection was purely a systemic one. And we have heard of some cases under similar circumstances in which tooth after tooth has been extracted, until the patient has become edentulous, and the neuralgia has continued just the same. Of course there are opportunities for other nerve lesions outside of the province of the dentist. This fact should be recognized, and we ought not rashly to sacrifice teeth on the slight chance that relief may be afforded. In my own case overwork carried too far, and without proper sleep and taking of food, develops slight neuralgia of the scalp. I never have neuralgia under other circumstances. I have also the testimony of a physician who was at one time an extreme sufferer from neuralgia, sometimes affecting the side of the face, and again the supraorbital region; and being unable to locate the cause, or to find it through an examination of the teeth or eyes by competent specialists, after a very careful, searching investigation of his whole physical condition he came to attribute it to a lack of good functioning in the stomach, and he has found that by a very careful attention to his diet, eating regularly, and keeping himself in a well-nourished condition, his neuralgia is very much better.

This is a very prolific study, and one which we should all pursue for ourselves, in order that our patients may have the benefit of the most skilled treatment which it is in the power of the dentist to give.

Dr. Eames.—I hesitate a good deal about saying anything, especially as the essayist has covered the ground carefully, and Professor Brackett has given detailed cases, illustrating quite fully the principles upon which reflex disturbances depend. I recall some cases of reflex disturbance, but they offer no different principles from those which have been illustrated both in this paper and in cases already mentioned.

I have one case under care and study at the present time, that I might well mention and report upon in the future, if it ever becomes possible for me to ascertain the disturbing factor in the case. It is the case of a girl sixteen years old, whose teeth have been under my care from infancy, and in whose teeth there are no deep cavities, for the slightest appearance of decay has been checked. I can find no lesion whatever about the mouth. The girl is extremely robust and healthful in appearance, very large and strong, and she takes part in all the vigorous exercises and games of the girls of her age. It is my belief that the predisposing cause of the neuralgic pain from which she suffers is due mainly to this condition of plethora just described; besides, she is at that period of development and growth in which there is unusual activity and excitability. If there is hypertrophy of the cementum, or if there is, at that early age, a developing wisdom-tooth which is giving pressure, or if there is any calcific formation in the pulp, I cannot find any evidence which will enable me to ascertain if that be the fact. I do know that she has gouty ancestry, or that in many of her relatives pulp-nodules have been found.

In discussing this subject we are reminded that there are cases of reflex disturbance in which there is a distinct dental lesion which can be found and the cause removed; there are also cases in which the cause cannot be found by any ordinarily careful examination, and in some of the cases the Röntgen ray is of great service,—for instance, in such cases as hypertrophy of the cementum, impacted teeth, unerupted teeth, etc.,—and the paper does well in calling attention to this means of diagnosis. Cases in which there is no dental lesion to be found, and in which the pain is probably quite remote from the irritation, indicate some constitutional disturbance, and therefore the only hope of relief lies in constitutional treatment.

Many cases have been cited here to-night of the existence of pulp-nodules with no symptoms whatever, and I have found such. I have also found many cases, especially those in which there was a gouty diathesis, in which the pulp-nodule has seemed to give rise to extreme neuralgic pain. It has been stated in the paper that neuralgic pain may be due to pulp-nodules or other calcifications pressing upon nerve-fibres in the pulp. I do not see how any calcification within the pulp-tissue can occur without pressure upon the nerve-fibres. Therefore, as we have reason to believe that there are many cases in which no response is made to the pressure of the pulp nodule, I conclude that in the cases in which it does give intense pain it is due to the general condition. The nervous system is in such an irritable condition that the mere presence of the nodule produces intense pain. In such cases our only hope for relief is in constitutional treatment; the patient must be put into a condition similar to that of those who have pulp-nodules without pain.

Dr. Jewell.—I would like to say just a word in regard to a case I had. The patient, a lady about sixty years of age, was sent to me some time ago by a physician. She had been having a great deal of neuralgic pain in her lower jaw. After a thorough examination I told her I could not find anything that would cause the trouble; that her teeth were all perfectly sound. She said she thought the cause might be the second molar, which had a small gold filling, but it appeared to be all right. In a few days she came back to me and insisted that the pain was in that second molar tooth, so I removed the gold filling and replaced it with gutta-percha.

The pulp was not exposed; in fact, the cavity was not very near the pulp. That change afforded her a little relief, but not complete relief, and I then removed the gutta-percha and cut down near the pulp, and found it extremely sensitive. I then made an application to destroy the pulp, which was not very successful. When she came in again I opened into the pulp-chamber and found a very large pulp-stone almost filling the entire chamber. Of course, the pulp was extremely sensitive, and I tried to allay the irritation by opening into it freely, so as to make certain of destroying it, and even then did not succeed in removing the sensation. Finally, as a last resort, I removed the tooth, and she got some little relief, but still the neuralgic trouble continued in a very severe form; in fact, she has it constantly. The query in my mind now is, how far I should be justified in opening into or extracting the remaining teeth.

She is an intense sufferer from neuralgia, and there is no doubt in my mind but that it proceeds from her apparently sound teeth. I think they are all or a part of them in the same condition.

Dr. Eames.—I would like to ask Dr. Jewell if in this case he was able to drill down into the roots to any extent?

Dr. Jewell.—Not fully. They were nearly closed up.

Dr. Eames.—I would simply suggest that sometimes these deposits extend quite a distance into the root-canal. In some cases, when seemingly the path is entirely calcified, if we penetrate farther into the canal we shall come in contact with living pulp-tissue. It may be it is the irritation of this nerve-tissue which is left which is the cause of the trouble.

Dr. Jewell.—In this case the roots were almost completely closed up. What I would like to know is how to treat such a case. Would I be justified in drilling into the other sound teeth, or in extracting them? The patient is still a great sufferer, and I have no doubt of the cause. The pain is confined to the right side of the lower jaw. The upper teeth are in good condition, very hard and dense in character.

Dr. G. T. Baker.—The case is almost identical with one I had in my practice, only the relief was permanent after the pulp-chamber was opened and filled.

Dr. Eames.—While in many cases of severe neuralgia the cause may be traced to calcified formations in the pulp, which being removed effect a cure, yet in one case I found such a formation which had never given pain. In the case to which I refer I was obliged to remove a tooth for the purpose of regulating, and after doing so I broke it open and found a large pulp-nodule. I have no theory to offer regarding its presence there, except to mention that there were some appearances of gouty diathesis in the teeth. There had been no caries in the tooth, and no disease of the pericementum.

Dr. Smith.—A most marked case of reflex neuralgia resulting from calcification of the pulp occurred in my practice a few years ago. The patient was a man who was suffering with excruciating pain from the shoulder down through the forearm. His physician had kept him under the influence of morphine for a week before the case came to me, and they felt that the trouble was caused by an erupting wisdom-tooth. The gum had been lanced thoroughly and well, without any relief to the poor sufferer. Finally he was sent to my office one Sunday morning. The wisdom-tooth was not erupted, but there seemed to be plenty of room for it to erupt. The second molar was unfilled. The first molar had a small mesial

cavity filled with cement. I diagnosed this case by eliminating from the diagnosis all other possible causes. The upper teeth were examined thoroughly, tested in every way, and I came to the conclusion that it might be a pulp-stone in this first molar. I explained to him what I thought, and that I proposed taking out the cement filling and making an investigation, giving him to understand that it might not be the cause of the trouble. I took out this cement filling, having to work very carefully on account of the extreme sensitiveness. The cavity did not extend near the pulp, but I continued to drill carefully until I made an exposure and found that a cornua of the pulp had calcified and detached itself, so that it acted like a shot put into the pulp-chamber. I removed the pulp-stone and dressed the cavity, and in two hours after he left my office he was free from all trouble in his shoulders and arm. I have had similar cases, but none where the relief was so prompt.

I am inclined to differ from those who think calcification of the pulp is not a frequent cause of neuralgia. Dr. Brackett has referred to the specimens examined by Dr. Cooke, stating that in the examination of a great number of extracted teeth, taken as they came, a large percentage of calcification of the pulp was found. Yet it seemed to me that while this investigation proved to us that the presence of calcific matter in the pulp was more common than we thought, it does not prove that patients who had those teeth had not suffered from neuralgia. I believe Dr. Cooke does not know the history of the teeth which he examined; they may have been the cause of treatment by physicians for some obscure trouble, and this trouble the physician may or may not have been successful in relieving. I feel, as I said before, that calcification of the pulp plays no small part in cases of neuralgia, the cause of which cannot be found, especially so where we have a cornua of the pulp calcified and detached, producing the effect of a foreign body in the pulp.

Dr. Werner.—We are not physicians enough to treat all cases of neuralgic condition. The perversions of the general functions of the body are, to my mind, many times the cause of neuralgia, and how we specialists can think our treatment intelligent or efficient by simply removing teeth I do not see. When an individual suffers from a thorough perversion of his systemic functions, with a decided uric acid diathesis, with an impairment of the whole eliminative system, composed of five or six miles of ducts, is it any wonder that a neuralgic condition exists, and how can such a condition be treated locally? Why not resort first to the treatment

of the perverted constitutional condition? I can have neuralgia if I work too continuously at my chair, if I eat meat three times a day and take no exercise, and can localize it more or less in a first molar. When I exercise, when I get plenty of out-door work, I do not have neuralgia; and when I do not find myself able to take the necessary out-door exercise I resort to the lazy man's way of correcting systemic conditions,—take a Turkish bath, and with the improvement of the general tone my neuralgia vanishes. It would be folly for me to think that I ought to have my first molar out, or that I should suspect a troublesome calcification taking place in the pulp. No doubt calcification is going on, but unless it becomes very marked or I become much debilitated, I will not notice it. I have long since ceased to think that by simple dental interference you can correct many of those obscure cases of neuralgia.

Dr. Andrews.—I wish to add a word to one phase of this discussion. In the course of his remarks, Professor Smith referred to the large percentage of pulp-stone found in apparently healthy mouths. I do not see how there can be an abnormal calcification of the pulp in the mouth of a very healthy person. There must be some pathological condition present to produce this result. A cause of much obscure trouble is often overlooked in our endeavors to diagnose the case. I refer to malocclusion, and the clinching of teeth during sleep, and the consequent irritation. In such cases there is apt to be over-stimulation of some active cell-tissues, producing a growth of bone, exostosis or hyperostosis of the root, or an irritation from the side of the pulp-cavity, in which case calcific excretions or growths form and grow into the pulp-tissue. I cannot see how this can be considered other than a pathological condition, brought about by irritation of active cell-tissue whose deposits are increased by the constant irritation. I have had some curious cases in my own practice which I have succeeded in tracing to the grinding or clinching of teeth in sleep. There will be one or two teeth which will impinge upon some tooth in the opposite arch, causing an irritation of periosteal tissue. This is shown pretty conclusively by patients saying that when they wake up in the morning the tooth is sore and has a sort of dull ache, which disappears later. During this time the patient may also have neuralgic pains at some remote point. Generally, I have found that grinding the occluding tooth so that it cannot be touched by articulation has proved very beneficial. In one case I tried for quite a long time to treat a neuralgic trouble about the head and face. I asked the patient, after some considerable treatment, if he was in the habit

of grinding his teeth. He said that he was not; but on another visit told me he found that when he was nervous he was in the habit of grinding on an upper cuspid, clinching it rather hard, and he had forgotten to tell me about it. On grinding the lower teeth a trifle, so that he could not articulate with the upper one, the recovery was almost immediate. I think the number of cases of obscure pain which might be traced to the grinding of the teeth during sleep is a great deal larger than we have any idea of.

Dr. Brackett.—It would be unjustifiable presumption in me to say concerning histology anything not in accord with our friend at that end of the table, yet it is my understanding that the calcification of a pulp is not an entirely unnatural process; that there is a steady deposit going on,—not markedly, as in some of the instances which Dr. Cooke reported in his investigations, but that calcification does go on until in elderly people, in some cases, the pulp is entirely obliterated. I have had several cases myself where a great amount of suffering was undeniably caused by calcifications in the pulp. One case was that of a lady who was in bed for two weeks, and was treated by a prominent New York physician for a severe neuralgia, and referred to me for examination of the teeth. I diagnosed pulp-stone in a molar, and was obliged to make several applications for the destruction of the pulp. After I got out quite a group of calcified nodules, relief came. I have had a few instances of obscure pain in sound teeth which, I have found out in a slow, blundering way, were occasioned by the dying of the pulp, without any explanation that I could find other than in one instance there was present a rachitic condition. The patient was a dwarf, and presented many physical defects. In that case I treated successfully four dying pulps in perfectly sound molar teeth. The history is much like that of a tooth that has been filled with metal close to the pulp. In my first case of this kind I was a long time in finding out that the trouble was caused by a morbific pulp. Another case was that of a lady in whose mouth I found a dying or dead pulp in each of four or five molars, and in every instance the teeth were sound or had been so previous to the dying of the pulp.

With reference to the matter of which Dr. Eames was speaking, a great many years ago there was brought to Dr. Riggs, of Hartford, a patient telling some such story as the young lady mentioned by Dr. Eames. This young lady was perhaps nineteen years of age. Her teeth were hard and strong, of excellent quality, and no cavities could be discovered on examination; but the patient

was suffering a severe neuralgia, extending from shoulder to shoulder. Other dentists had made careful examinations without being able to discover any cause for the trouble, and the case was pronounced to be one of intractable neuralgia. Dr. Riggs said, on inspection of the case, that the trouble was undoubtedly caused by hypertrophy of the cementum. It seemed as if he knew by intuition. Anyway, his opinion was regarded of such value that his advice to remove from a fairly regular arch four perfectly sound bicuspids was followed. His diagnosis proved correct, for it was found that on the roots of the bicuspids exostosis of the cementum had taken place, and his theory that the relief of the crowding would be followed by a cessation of the suffering also proved to be the fact.

Dr. Andrews.—I was not referring to normal calcification of a pulp-cavity from the odontoblastic layer, which takes place evenly all over the cavity as age goes on, until in some cases two-thirds or nearly the whole cavity has become calcified. This is entirely different from the calcification which produces excretions which might be compared to a papilla of bone growing into the pulp-substance. I have several cases in my own collection of specimens where there are growths like papilla coming from the side of the pulp-cavity, and in some of the cases this abnormal calcification has grown to the extent of almost closing up the pulp-cavity. This calcific growth goes on independent of the odontoblasts, and is at the expense of the connective-tissue cells of the pulp-tissue, and is the result of some pathological condition, and not the normal growth from the whole odontoblastic layer, which, as I have said, may go on to the extent of almost closing up the pulp-cavity and yet be a perfectly normal and healthy condition.

President Cooke.—In regard to the percentages of teeth which I found containing pulp-stones: as I remember it, I cracked up about five thousand teeth, and out of that number I found over a thousand containing pulp-stones, varying in size. The largest percentage was found in the molars, which, I think, contained something like thirty per cent. The cuspids came next, with a little more than ten per cent., and the bicuspids and incisors were about the same, showing but a small percentage in each. I do not think that every time you have a pulp-stone you have neuralgia. It is my belief that, if I cracked up every extracted tooth I could find, I would get about the same percentages of pulp-stones that I found in those which I did examine. It has been suggested that we do not know the history of them. That is very true, and many of them

may have caused trouble which the physician or dentist could not account for. I think it would be interesting if we could get statistics showing the number of cases in which we have treated neuralgia by the removal of the deposit called pulp-stone. I think they would be comparatively few, and yet I think the number of pulp-stones in the mouths of our patients is very great. In speaking with a specialist on nervous diseases with regard to this subject, he said it would be possible for the pulp-stones to be present, and while the tone of the body was up a person would feel no inconvenience from them, but if the nervous system should in any way become run down, then you would be likely to get twinges from the teeth. They might be the point most easily irritated. That is his theory.

When I was making investigation, I became so familiar with the peculiarities of teeth that in looking them over I would say to myself, "There is a pulp-stone in that tooth," and I would find one in almost every instance. In some cases they would be small, like shot, and in other cases would almost entirely fill the pulp-cavity. I remember one lower third molar which I cracked open and found the pulp entirely calcified, but was movable in the cavity. In cases of decayed teeth, it has seemed to me that the calcific matter has been thrown in not so much to protect the pulp from decay, but has probably been caused by the irritation of the decay. I sent about three hundred specimens of the different kinds down to the Harvard Dental School, where any one who is interested may examine them.

Most of the teeth that we are called upon to treat are imperfect in some way, and, taking into consideration the conclusion which I reached in my investigation,—that the percentage of pulp-stones is about the same in all teeth,—in the treatment of any obscure trouble in which the teeth are suspected, I should recommend trying everything possible in the way of local and systemic treatment, and finally treating for pulp-stone.

At a meeting of the American Academy of Dental Science, held March 2, 1898, Dr. Thomas Fillebrown, of Boston, read a paper entitled "Secondary Operation for Harelip."

SECONDARY OPERATION FOR HARELIP.

BY DR. THOMAS FILLEBROWN, BOSTON.

The lip represented by the accompanying figures was operated on for closure of congenital fissure by the attending physician when the patient was an infant a few days old. The operation was very well done. An abundant length, vertically, of the lip was obtained, and complete closure of the fissure. Of necessity the upper lip was narrow horizontally, being not more than two-thirds the width of the under lip. This of course made the under lip pout forward, while the upper lip remained very flat, receding, and immovable. This is shown in Fig. 1. The patient was unable to widen it at all when laughing, or to raise it under any condition. The muscles were powerless to affect it.

The object sought by this secondary operation was the widening of the upper lip to equal the width of the under. I adopted the following plan, and the results justified my selection. The cheeks seemed to be the proper resource, and I proceeded as follows: I made the incisions *a b*, *a b*, Fig. 3, from the corners of the mouth backward a little more than half way through the cheeks. I then cut out and dissected off oblong flaps *e e*, Fig. 3, from the inside of the mouth, represented by the dotted lines, Fig. 3.

The parts were now free from each other, and I drew the flaps of mucous membrane through the incision and sutured them to the edge of the skin on the outside of the incision.

This made a red border for the additions to the lip. To gain the additional width I made a perpendicular incision from *b* directly upward one-half the length of the incision, *a b*. Then I straightened out the last incision, bringing the point *a*, Fig. 3, to *a*, Fig. 4, the point *b*, Fig. 3, to *b*, Fig. 4, and *c*, Fig. 3, to *c*, Fig. 4. The sutures on each side held the edges together on the outside and two within the mouth closed the gap left by the taking of the flap for the red border of the lip.

This carried all the new red border into apposition with the red border of the under lip and made them of equal width. The result is shown in Fig. 2. The size of his mouth was increased

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

one-half. In two months the boy could show all of his upper teeth when laughing, and could give as good and hearty a whistle as any boy of his age, an accomplishment of which he was very proud.

The right nostril was considerably flattened and too large. A V-shaped incision, as represented in Fig. 3, corrected this feature and made the nares almost symmetrical. Of course, there was a slight fault in the orbicularis muscle at the corners of the mouth, but that almost wholly disappeared in the course of six months.

The general plan of the incision used in this case can be applied with advantage in many cases where sufficient tissue and mobility are not obtained at the first operation.

Dr. George S. Allan read a paper before the American Academy of Dental Science, May 4, 1898, entitled "Independent Journalism from a Dental Stand-Point."

INDEPENDENT JOURNALISM FROM A DENTAL STAND-POINT.

BY GEORGE S. ALLAN, A.B., D.D.S., NEW YORK CITY.

Mr. President and Members of the American Academy of Dental Science,—For years the profession of dentistry has been drifting on the great sea of the world's occupations. It has been moved more by the currents of public opinion or self-interest than by any fixed purpose or ambition to be satisfied. Nor has it recognized that added strength that comes from being a part of a great whole, or placed itself where it could feel the momentum or partake of the benefits of associated powers. No one questions that dentistry is a branch of the healing art, and a most important one, but dentists are recognized as doctors only in name. The dental diploma neither admits the possessor to membership in medical societies nor gives him the benefits and advantages which rightly belong to him as an integral factor in one of the most learned, and, from a humanitarian stand-point, most appreciated and honored of the professions. All recognize this fact, but only a few see clearly why it is so, or are in a position to point out the road to reform and to lead the way. If dentists have lost their birthright, they may be certain that the fault lies, not with their parents, but with inherent views and habits of the offspring. Man loves life, and this love of life and health sought a mate and found it. The mate was called Knowledge,—knowledge of the laws governing life and health, and of the means for regulating and controlling them. The child of this "love of life" and its mate, Knowledge, was called Medicine. But medicine does not call one part of the body essential and important, and another not so. It does recognize differences in degrees of importance and value, but at the same time clearly asserts that all are mutually related to and dependent on one another. The truth is, the teeth are all-important for health and comfort, and their good or bad condition makes for human happiness or the reverse, and the dentist in no way occupies a second position in the great domain of the healing art. Why, then, does he willingly take a

back seat? What influences are at work to keep him from his birthright, and what can be done to overcome them?

Burns, who sang so sweetly on many themes,—alas, that he should have left the world so young in years!—saw clearly many things relating to human life, and one want of power he most beautifully and strongly presents to us in his memorable lines,—

> "Oh, wad some power the giftie gie us
> To see oursel's as others see us!
> It wad frae monie a blunder free us,
> And foolish notion."

There is much wisdom in this homely verse. Let us try to avail ourselves of it by putting ourselves outside of our daily life, and endeavoring to take a correct view of things as they are.

First, dentists do not practise their art *ex cathedra*. As a class they do not hold medical diplomas. There are many reasons for this, some good, some bad, but the parent profession is in no way responsible for any of them. At all times that profession has been ready and willing to extend to us a welcome, acknowledging the right and justice of our claims, but at the same time it has said that we were not entitled to special privileges. In other words, recognition could not be extended to any but those who hold the medical diploma, and to obtain that a special course of study and preparation was necessary. So soon as dentists put themselves in line with the other branches of medicine they would be received into the fold. No criticism can be made on this action, or lack of action, on the part of the medical profession. If they should open the doors to us without this formality, it would not be long before the oculist, gynæcologist, and all other specialists would be claiming the same rights, and there would be an end to the unity of the profession. But there is no time to discuss this phase of the question. In good time the operation of natural laws will bring about its proper solution. It remains for us only to prepare the way, as far as possible, to remove obstacles, and trust to time and the normal growth of the profession on general principles to complete the work. Then we can and will take our right position naturally and easily. It is the part of wisdom, then, to order our lives and conduct in such a way that when the time comes we shall be ready for it.

To practise medicine two things are essential: first, the diploma, which means that the holder has taken the prescribed course of

study and passed his examinations; second, that he shall live up to a special code of ethics; and these latter are based not on moral law only, but have added to them certain other principles, the meaning of which is that those who practise the healing art must order their lives and practice on different lines from those who engage in commerce and trade. These latter laws say that the physician occupies a different position in offering his services to suffering humanity from the merchant selling his goods. I do not for a moment suppose that the medical code of ethics implies any claim, on the part of the medical profession, that its members occupy any higher ground in the moral law than other workers do. The moral law is for all humanity. It governs and controls all alike. Therefore these additions to the moral law, which, after all, are the groundwork, the warp and the woof, of the whole code, are intended only for regulating the life and work of doctors on certain prescribed lines. They are the result of years of study and thought, they are fundamentally correct, they exert a most salutary and beneficial influence, and they are far more likely in the future to be strengthened and added to than to be dropped. The reason for this it is not at all necessary in this place to enter into. All of you are acquainted with the rules of the medical code, and their meaning and power for good. We have but to accept them as truisms.

In what respects do the dental codes of ethics differ from those of medicine? and—what is more to the purpose—to what extent does the profession enforce them? These are pertinent questions at this time.

It may be stated that dental codes do not differ in essentials from medical codes, but in their enforcement there is a wide difference. The former, to a great extent, are dead letters, and little or no attention is paid to them; and for this sad condition there is but one explanation,—the profession, as a whole, does not believe in them. Just the contrary condition holds with physicians as a class. As a whole, they do believe in codes, written or unwritten, and their rigid enforcement follows, as a matter of course, without question. The *esprit de corps* is alive and active in the one case, and nearly inanimate in the other. The tendency in the one case is to detach the profession entirely from trade influences, and to black-list without mercy those who hold to them. In the other it is to make use of such influences, if not openly, at least covertly, and to excuse those who employ them. Few of those who are posted and have given the subject any attention will question this

broad statement. So it amounts to this: dentists are not doctors, first, because they do not hold the medical diploma, and, secondly, for the reason that they do not believe in or live up to the medical code of ethics. *In posse* they are doctors, *in esse* they are not; they occupy a sort of border-land, and so do not hold the respect of or confidence of either of their neighbors. They are neither doctors of medicine nor tinkers. Custom calls them doctors, and as regularly adds the interrogation mark. The right hand of fellowship and comradeship is not extended to them by either party, and so, perforce, they have to, as the saying is, meet with themselves.

Some of our brothers seem to be happy in the idea that we are sufficient unto ourselves, and that we neither want to nor can be benefited by any alliance with medicine in general; that it is better to "go it alone," and so gain in self-respect and strength of character, power, and influence.

Well, I wish some of those who profess this belief would show us just where the line of separation between doctors and dentists can be placed, or give a satisfactory definition of the term specialty of medicine, one that would exclude dentists, and at the same time admit the hosts of other specialists that seek refuge under the paternal roof; or possibly they can tell us why, if it is better for us to live independent lives, it would not be equally advantageous for some of our professional relations to follow the same course, and why they do not endeavor to break the shackles that deprive them of a coveted liberty like unto that which makes us happy and prosperous. Are they blind, or only stupid? Or is there a real or fundamental difference between our callings? Is there an actual difference between the tissues and organs of the mouth and other parts of the body? One so radical that he who provides for the health and comfort of the dental organs and adjacent related parts must needs have a different title and position from his brothers?

If a good and sufficient answer cannot be given to these queries, then there is no reason why we should not seek our relations. If "blood is thicker than water in human affairs," so like views of life, its duties and responsibilities, should join together in an harmonious whole those who seek common ends.

Those who practise dentistry as an "art" must needs coin a new definition of the word if they wish to make it appear that they practise on lines different in any of its essentials, except in degree, from those who are disciples of the "healing art." The use of the term simply misleads. The desire is evidently to push to the front

the æsthetic meaning of the word and give it undue prominence.

It would appear, then, that those who aim to broaden the lines of their work by merging their specialty in the general practice of medicine are but seeking that which is rightfully theirs already. In no sense of the word can it be said that they are trying to push in where they are not wanted, or that they are toadying to any set or class of men. They simply demand recognition of what they are,—nothing different, either better or worse. When they have obtained this, then they will be fully prepared to do their full share of all the work demanded of them, to accept their responsibilities, and give a full equivalent for all benefits derived.

If as much attention were given to the anatomy, physiology, and pathology of the teeth in the regular courses of medicine as is given to other parts and organs of the body, much benefit would accrue to both the general practitioner and to the specialist. The former would not make the many mistakes and blunders in diagnosis and treatment to which we dentists so frequently have our attention called. It is not an uncommon thing for the dentist to think, "If Dr. X. does not know any more about the other organs of the body than he does about the teeth, I am sorry for his patients." On the other hand, if the dentist were educated as a doctor, and his professional education founded on the principle that the teeth in no essential respect differ from the other organs of the body,—that they are living parts of a living whole,—he would not be less of a mechanic, but he would be more of a physician, and so every one concerned would be benefited, humanity most of all.

It is more than probable that the condition of affairs of which I have spoken is largely due to inherent causes, those that operate from within the profession and have their origin in the nature of the services rendered, which are largely mechanical, calling for special tools and appliances; these in turn force the dentist to be a mechanic, and cleverly and rightly encourage the inventive genius. The dentist who invents something new and valuable, not being held in control by the professional code, naturally seeks to profit by his labors and study, and is sorely tempted to take out a patent. As conditions are, I, for one, do not much blame him for the position he takes. We can hardly hope to see a rule that does not hold all in its grasp enforced from sentimental reasons only. Self-interest is all-powerful, and the ready excuse, "I am only doing what others do," is ever ready as a salve to the conscience. To the great credit of the profession, however, it can be safely said that it

is steadily turning its face against the practice, and few self-respecting dentists to-day can be found who will either countenance the practice in others or make use of it themselves.

Of all the influences that have operated to the disadvantage of the profession and have tended to keep it away from the true professional standard, no one can be compared with that of the dental depots. These great establishments are organized and conducted on a strictly commercial and trade basis, and naturally and rightly conduct their business on laws and methods governing such establishments. They seek first of all their own good, look to their own interests, and care nothing for the advancement of the profession except in such ways as will add to the volume of their sales and their annual credit balance. No fault can be found with this fact, either as to its truth or the principles involved. The proprietors of these depots are in the business to make money, and it is folly to suppose for an instant that any other motive to any great extent influences them, or that they could be expected to part with any trade advantage for the sake of the professional *esprit de corps* among their customers. I see no reason to question their right to manage their business in their own way so long as they do not offend the general moral law; and, as a whole, I think they are managed honorably and justly, and aim to give, as they do give, a fair return for the cash received over the counter. Those I have known—the best—have been men of high character, and trustworthy in all business dealings. Still, I do not hesitate to say that the profession has lost more in prestige and power than it has gained in all other ways by the too intimate relations that have existed heretofore between it and these concerns. This relation has been a curious one, almost unique, for I doubt whether its like can be paralleled elsewhere. The depot has been an ever-present power, more so in the past than in the present, and the profession has taken kindly to its presence, guidance, and help in its various gatherings and conventions; has sought the depot's aid and taken its cash on many occasions when clouds seemed to be gathering and the future looked full of trouble. It is foolish to ask what were the motives of the depot managers on these occasions. It is just possible that they placed their money where they thought it would do the most good; and it is possible, for those who care to think so, that they were governed by high and generous motives. What was the opinion of the greatest among them, and the one who profited the most by his connection, may be judged by his indignant rejoinder to a question I put to him; asking me, "Where

would the dental profession be to-day if it had not been for this great establishment?" Evidently he had the impression that if it had not been for the care, attention, and devotion of the foster-mother, the great establishment of which he was the head, the profession would still be in the pangs and dangers of parturition. I well remember the strong inclination I had to tell him that it was just possible that the care and attention the profession had received had not been altogether in the right direction; that it had been led into unnatural and erroneous ways, and that a good bit of manly, healthy vigor had been lost by the over-zealous and not altogether disinterested care bestowed.

The trade influence has kept alive and encouraged the whole system of patents and analogous methods, which are entirely anti-professional, if not absolutely ruinous to all the instincts and traditions and special laws of such a life; and, as if this were not enough, the whole system has been of a character which, while encouraging the individual, has defrauded the profession of such benefits as would follow were competition open and patents not allowed.

To the individual who has hit on a new device or principle, and has no scruples to benefit thereby, the manufacturer offers the customary royalty, gives him all the credit for his invention, pats him on the back, and tells him that he has a right to claim that which is justly his due as a result of his brain-work and study. To the unfortunate, who has some professional pride and feeling, he offers another bait,—one more suitable to his refined nature; it is somewhat like this, "Your views are quite right, and I respect your principles, but do you not see that in case the manufacturer is not protected, he cannot afford to give his time and capital to turning out goods when his competitors can at any time step in and compel him to share the profits thereon by manufacturing them themselves? It will require special tools and skilled labor to make a finished article, and these must be paid for, and if these are not given your invention will fall flat and you will get neither cash nor reputation. Now, if you will take out a patent on this valuable appliance and give me the sole right of manufacture, I will see to it that the goods are well and properly made according to your directions, and will charge only a fair manufacturer's profit, minus the royalty that would otherwise have gone to you." This bait has caught many well-meaning brothers, who have repented at leisure and in sorrow when they have found that they bartered their heritage of principles for a mess of pottage, and that their protestations of innocence and of good intentions were only, at best, half

believed, and who with clearer vision have been made to see that open competition would have compelled a manufacturer to do his best to hold the market; that the invention, if valuable, would have pushed its own way, and that many sources of supply would have added to his credit and reputation by making it more widely known and appreciated.

A valid patent gives the holder thereof the sole right to manufacture at such times and in such quantities as may suit his convenience or expected gain. The working of this law has resulted in depriving dentists of the aid, advantage, and benefit of many valuable and helpful tools and methods of practice. For, as often happens, one invention is likely to interfere with another which accomplishes the same purpose in a different and perhaps simpler way. Of course, the manufacturer who has capital invested in one invention does not want to be interfered with by a rival, and so buys up the new invention and locks it up until such time as he can safely and prudently allow it to see the light. In this way the profession, as a whole, has suffered greatly, and out of all proportion to any benefits derived.

I have wandered too far from the real purpose of this paper, and now ask your attention to consider with me the true meaning and influence of the terms "independent" and "trade" as applied to journalism.

It is rather a startling assertion to make, still I make it unhesitatingly and without a doubt as to the correctness of my position, that the depots have captured our literature, and have been and are using it solely for mercenary trade purposes, and that in all doubtful cases or questions, the good of the trade takes precedence of the good of the profession. Now the literature of any profession or calling in life ought to be kept clean and pure and free from admixture with deteriorating influences. It should neither directly nor indirectly give aid or support to those who differ from it in the essentials of its life and being. Least of all should it be allowed to become the main support of any manufacturing establishment in pushing its wares on the market. The holding of these views does not in any way militate against an independent journal devoting a certain number of its pages to advertisements, accepting those that properly belong to its purposes,—those that will add to its value and help its income. But the literary department should control and direct the advertising department, and that is a vastly different state of affairs from that in which the trade department controls and manages the literary department, and uses it simply as a means

of pushing its advertisements where they will do the most good. The art of advertising is important and valuable just in proportion as it can be made to attract the eye and reach the proper class of readers, and business men devote large sums of money for these purposes and employ special talent to make their announcements attractive. The dental depots save the greater part of this outlay, the dentists themselves kindly furnishing in most cases the special talent, gratuitously at that, and then paying for the "advertisements" in cash subscriptions for the magazine. No other class of business men are so fortunately situated as these publishers. They get much for little and have the laugh all to themselves! The subscriptions pay the bills and the advertisements cost them nothing or next to nothing. And yet you will find dentists and classes of dentists and societies who support this very pretty arrangement and say it is all right and "so handy." The depots appreciate all their advantages, but do not change their colors; they are the same old tradesmen,—just the same, and the tradesmen's codes of ethics, and those only, regulate their business life.

But this is not all. The former editor of one of our leading journals openly claims that his journal had made the reputations of many of the prominent members of our profession. He believes what he said, and, as the men were worthy of the honors conferred, feels naturally proud of his work. I do not question the correctness of his statement; but when I first heard it, the thought came into my mind, Cannot the same power that makes one man's reputation destroy another's, or keep him from obtaining his just dues? and is it right or proper to put so great a power for good or evil in the hands of those not guided and controlled by the same code of ethics that we live under? Think of it. Tell me, if you can, honestly, whether such power should live outside our ranks?

Much stress has been laid on the claim made by the leading trade journals that the editors are free to manage their department as they think best. True, indeed, to a great extent, but in all these cases the editor has no control whatever over the advertising pages, —in fact, has nothing to do with them. So these journals at the best are only half professional, and the other half trade; and when you come to think of it, they are literally all trade; for the sweeter, the more pleasant, and the more digestible the editor makes his pages, the more push the whole will have in the right direction; and that is his special business. How blind must a man be who cannot see through so big a hole! No wonder all dental depots want a journal, and want it badly; for their success and life depend on it.

Years ago, one of the heads of a depot, now out of existence, said to me, "I want an organ and must have one, or I cannot compete with these big fellows." Shortly after he started one,—he had to,—but success did not go his way, and he gave up the fight.

The plea made by those who support the trade journals is that few or none of the dental societies can afford to publish their own proceedings; they have not the means, and therefore it is a matter of necessity to give them to the trade journals, and a few societies —to their shame be it said—accept pay for them. Well, it does look, as the saying is, rather "off color" for a reputable society to sell its proceedings. But think a little: in what respect, but one of degree, does the society that sells its proceedings for cash differ from the one that gives its proceedings to the same journals? In the one case the society gets its proceedings published free of cost; in the other, it obtains the same advantages plus so much cash. In both cases it amounts to so much cash in pocket, and that is all. No, it is not all. There are some things that honorable men do not sell, least of all are they willing to sell their principles.

> "Who steals my purse steals trash;
> But he that filches from me my good name
> Robs me of that which not enriches him
> And makes me poor indeed."

Honorable men will not part with any of their self-respect, not for cash, at all events.

Taking the most charitable view of the case possible, the society which gives its proceedings to a trade journal puts itself under obligations to that journal. Well, some do not relish the thought of accepting such obligations, and do not rest content when they have to accept them. They become restless and discontented, and make every effort to get rid of them, for they find themselves in a false position. There is an old saying that he who accepts a favor must take a kick before he can get rid of it. It seems to me that our profession has got its kick, but it has not got rid of the obligation. It may serve our purpose to make a direct comparison between the two classes of dental journals.

The trade journal is in all essentials the organ of some dental depot or manufacturing concern. It is made for profit, published purely as a matter of business, and as a whole is simply an advertising medium connecting the dental depot and its customers. For convenience and policy's sake it is divided into two parts, the literary and the advertising. The advertisements alone would have no push

or power, and would in a great measure fall flat, and find a quick burial in the waste-paper basket. Even if glanced at, or partly read, they would quickly be forgotten or mislaid. They must be kept alive, in evidence, ready for reference, and where they can be seen, or they will fail. So the literary department is most wisely attached to rescue the advertisements from their inherent weakness, to give them life, character, influence, and the power of self-preservation. The dentist takes his journal in order to keep himself posted in matters relating to his calling. He feels that he must keep abreast of the times, and prides himself on his ability to give his patients the full benefit of the labors and thoughts of his fellow-workers; and for their value in this way the papers are kept for reference and study, and they are kept in whole and not in part. Nominally, the literary part of the journal is of first importance, but in reality the advertising half holds that position, and the journal would have no meaning to the publishers if this relationship did not exist. Now, I, for one, hold that it is a palpable infraction of the moral law for a trade journal to print on its title page "A monthly record of dental science, devoted to the interests of the profession." More honest and correct would it be if made to read, "A monthly record of dental science, published in the interest and for the benefit of the X Y Z dental depot." I strenuously object to seeing the professional flag floating over a trade fortress. It may look pretty, but it is sadly out of place. It is deceptive and hides a masked battery.

The independent journal stands for quite a different thing. It stands for the profession and the profession only. It means the absolute control of the advertising as well as the literary matter, and means that the latter should in fact as well as in name be the essential part of its existence. In no way whatever should it be published for profit, except inasmuch as the profession may reap the whole benefit thereof. Every dollar received in excess of the cost of manufacture should be turned into the common fund, and be used solely for improving the journal or as a safety fund. It should not be allowed to contribute to the profit or advancement of any individual or class. The journal should float its own colors and fight for them. A high professional standard should be insisted on, and advocated in all proper ways, by example as well as precept.

A journal or journals—and they should be many—so conducted and supported by the profession ought to have and would have a marked influence for good, and go far towards relieving the profession from the trade-influence incubus it now labors under.

In 1890—I speak from memory—I had the satisfaction of hav-

ing a contribution on this subject refused by the *Dental Cosmos.* The reasons given were trade reasons only, and had nothing to do with the real merit of the article, which, indeed, was admitted. Before sending it, it was submitted to several of our leading men and by them fully endorsed in all respects. This is not an isolated case.

It is curious how habit and custom confuse thought and blunt the moral perceptions. For so long a time have dentists either given away their literature, or marketed it to the highest bidder, that they have ceased to consider the highest questions involved, or the obligations they rest under to the profession as a whole.

The strong societies ought to meet the issue fairly and squarely, set the fashion, and pay their way, including the salary of the editor, and then the weaker ones will gradually fall into line to the extent of their ability; all will gain thereby in self-respect and in influence. The editor of a trade journal is employed by the depot managers—his salary is paid by them—and is in all essentials their servant. Can he serve two masters? The greatest of all authorities says, *No!* No matter what his impulses or ambitions may be, he is not, and in fact cannot be, a free man.

As a rule, mankind values most that which costs the most. If dental literature is valuable to the depot managers as a means for selling their goods, it needs must have as great or a greater value to the profession for disseminating knowledge and principles. It is most reasonable, then, for the societies to pay a little more and keep the reins in their own hands,—in other words, to pay a journal owned and supported by the profession a fair sum for publishing their articles. Even were they to gain in no other way by so doing, they would gain much in self-respect, and that in this instance amounts to a great deal. But a greater good lies hidden under this little matter of dollars and cents. I have too great faith in my brothers to believe that when they once fairly grasp the principles involved they will longer submit to their unworthy thraldom.

In what I have said there may be some strong or even harsh expressions. If they so appear to the reader, kindly overlook them, and credit me only with a strong and earnest desire to advance our common interests, ambitions, and hopes on correct lines.

I know of many good men who hold contrary views from those which I have expressed, and I respect them and their views, for they are as honest as I am, and equally desirous of advancing the good cause. I am sorry that this difference of opinion exists. In the end the right and the best will prevail.

Rossini, in his famous opera, "The Barber of Seville," written in

the early part of this century, puts into the mouth of Figaro, where he boasts of his skill, "I am barber, surgeon, and jack of all trades, and my pockets are never empty," and later on he says he knows all about the people, as he is barber, hair-dresser, surgeon, and major-domo of the household. At this period the surgeon and the dentist occupied similar positions; neither commanded the respect of the people. They were tinkers, and tinkers only. As time went on, the surgeons, step by step, advanced, and, joining hands with the physician, pushed their department of medicine into great prominence, and to-day no class of men can claim a prouder position than they. Times have indeed changed with the surgeon, but the calling of the dentist still lags behind.

If, now, you will turn to your copy of the Century Dictionary, the last edition of which has but recently been published, you will find that a dentist is "one whose profession it is to clean and extract teeth, repair them when diseased, and replace them, when necessary, by artificial ones; one who practises dental surgery and mechanical dentistry."

How do you like the pen-picture which this great authority places before your eyes? The first definition given in a dictionary is generally the main one, the one commonly accepted as correct. The definition quoted is not quite up to date so far as the opinions of some of you are concerned; but, alas! we must take the position assigned to us by the combined verdict of the masses, and, in the main, I believe the masses judge rightly, for their judgment is founded on that estimate which any man or set of men place on themselves and live up to.

In the early dawn of the twentieth century I hope to see the definition read something in this way: "Dentistry is a specialty in medicine, dealing with the oral cavity, with especial reference to the medical and surgical treatment of the teeth." If that good day is to come, as soon I hope and believe it will, then we must meet together with a common purpose and work for what we believe. The fountain-heads of instruction, our colleges, societies, and journals, must be made to push the thought and principle both by precept and example. The student must grow up with the thought that he is in fact a doctor of medicine,—not half doctor and half tinker. The time for push and work is at hand, and all lovers of their profession should take part and not rest till the prize is won.

"There is a tide in the affairs of men
Which, taken at the flood, leads on to fortune;
Omitted, all the voyage of their life
Is bound in shallows and in miseries."

Gentlemen, I believe the tide is now in our favor, and that the time for work is at hand. The subject, as has been well said, is in the air, and needs but a strong and united effort to mount the crest of the wave that will lead us on to fortune. The faith that is in us must be fought for earnestly, hopefully, and manfully, and the truth will surely prevail.

DISCUSSION.

Chairman Pond.—In the discussion of any question involving our advancement as a profession we have often received words of encouragement from members of a profession which always stands for the right. We have with us to-night a gentleman whose studies of the Puritans in England and New England will give added weight to his opinions with us, of New England birth. I refer to the Rev. E. H. Byington, D.D., of Newton.

Rev. E. H. Byington.—It will not be possible for me to add anything of importance to the very interesting discussion which we have listened to. I find that I did not understand at all what was meant by "independent journalism." I supposed that "independent journalism" meant something like the independent journalism which we have in the city of Boston, in a paper like the *Boston Herald*, which is more or less independent of all political parties, but not by any means independent of its subscriptions. The editorials and whatever is of interest to the reader is supposed to be unbiassed and independent in character. I find, after hearing the paper, that you are dealing with a subject which is very much more scientific and genuine.

I could almost have thought, while the paper was being read, that I was in a meeting of ministers, so high was the ethical tone of the paper, so constant and careful was the reference all along to the highest moral principles, and so desirous was the speaker to set forth the truth in regard to the matter. The fact is, gentlemen, in the profession which I represent we have a good many questions that are constantly coming up very much like this question that is before you. There are depots and bases of supplies which are closely connected with the theological profession, and there are sometimes presented in religious journals articles which, when the truth comes to be known, are found to have been shaded by mercenary motives; and it is not possible, even among ministers, to avoid those tendencies to which the selfish instinct within us constantly exposes us.

I wish you great success in the effort that you are making to bring the very highest principles into all these matters relating to

your most useful profession, and I hope that in my own profession we shall be able, if not altogether to eliminate this tendency to pecuniary motives, at least to hold the evil influence in check.

Chairman Pond.—I am sure all of the older members of this society remember Dr. H. C. Meriam, who was formerly one of our prominent members, and you also know the stand he has always taken in matters of this kind. We have Dr. Meriam with us to-night, and would be very glad to hear from him.

Dr. Meriam.—It is rather a hard thing for me to say anything new on this subject. The president kindly alludes to a strong stand that I took in some previous years. I can assure him that in the semi-retirement that I have enjoyed for the past few years it has often seemed to me that I was entitled to a good deal of credit for not saying "I told you so." But the time has gone on, and I think that every one who has really interested himself has noted with great satisfaction the progress which has taken place in this direction. Mr. Whittier once said that he could conceive of nothing better for any young man than early in life to connect himself with some unpopular or neglected cause and press it to the front, and stick to it until it received the attention that the world would not otherwise give. There has been a gradual recognition of the fact that if dentistry is to be a specialty of medicine, it must have the same means of independent expression which the other specialties have. I venture to say that there is no specialty of medicine where the members do so much work, where they pay so much for the materials which they use, or where their work is done with such a strain on physical health and vigor.

You may remember that in an earlier paper—I think the very first paper that I wrote on this subject—I said we had no reason to complain of the shops. They were the delight of student days, and even now we can exclaim, as did Goldsmith of his muse,—

> "Thou source of all my bliss and woe,
> That found me poor at first and keeps me so."

And right here we touch again the side of the intellectual enfeeblement of our profession. The man who to-day can stand in any one of our shops and say that the dental materials are in advance of those of any other profession is an ignorant man. Let him but step into the shops where are exhibited scientific, electrical, surgical, or chemical apparatus, and he will find things that are infinitely more wonderful than are offered in our shops. I am

sure that statement will be fully corroborated by Drs. Allan and Andrews.

Our duty is to keep an open door so that all progress relating to anything we need to do or use is not impeded. There is a tendency to teach in the dental schools the use of only such things as can be bought ready made, so that the students have a limited idea of the resources open to them. To buy ready made things and then trim the patient until they fit does not broaden men or develop their reasoning powers.

Dr. Potter.—It may be known to some of you that a few of us have been off on a short visit to New York. It has not been simply for pleasure. We had a very important meeting there, which was arranged by the Institute of Stomatology. We devoted a whole afternoon and evening to the discussion of professional morals, professional atmosphere, and all those things which Dr. Allan has summed up in his paper. I consider it is one of the most important dental meetings I have ever attended. At the close of the meeting there were a set of resolutions proposed and adopted as expressing the sense of the meeting on these important matters, and later the chairman, Dr. Bogue, asked me to bring this set of resolutions to the Academy and read them, to show what the Institute of Stomatology had been thinking about and doing, and with the hope that these resolutions might find a ready response in this society. I think I cannot do better than to read the resolutions at this time.

Dr. Potter then read a series of resolutions adopted by The New York Institute of Stomatology, May 3, 1898, and printed in the INTERNATIONAL DENTAL JOURNAL, July, 1898.

Dr. Andrews.—I make the motion that those resolutions be adopted as the sense of this Academy.

Unanimously voted.

Chairman Pond.—There is one more gentleman whom we are always glad to hear from, and who always takes an advanced stand on questions of this kind. I refer to Dr. Charles A. Brackett.

Dr. Brackett.—I feel like expressing a somewhat different view regarding the dentist—his moral quality, his position in the community, the way he is looked upon by his fellows—from that which the paper presents. Without any disposition to detract from any other profession, I do not think the dentists of this city, the dentists of this commonwealth, of New England or New York, are men who occupy a lower moral plane, with less thoroughly ingrained genuine morality, with a lower standard of ethics, personal or professional, than are the holders of the M.D., or other pro-

fessional degree. Now, in the city in which I am a resident we have a worthy group of medical practitioners who deserve and command the respect and confidence of the community. We have a good number of practitioners of dentistry whose standing in the community is as honorable as that of the practitioners of medicine. I do not think any patient of any dentist in the city of Newport going to another dental practitioner would receive from any one of the twelve or fifteen located there any advice, hint, or insinuation that would not be honorable. I do not think there would be any attempt to hold out any inducement to continue in his charge. I think there would be more readiness to advise the patient to go back to the dental adviser to whom he or she had been accustomed to go. I do not think our code of ethics is wrong. I do not think the nature of the practice of a dentist, having as much as any professional man can have the need of blind, unquestioning confidence on the part of those whom he serves, will admit of the moral standard being in any sense lower than that of any other body of professional men.

I expected that the essayist would have something to say in regard to our personal duty in connection with independent journalism. He has not come here with any word of upbraiding, such as "You have not stayed up our hands," or "You have not done for us as we expected," and yet I hoped he would point out some of the things that we ought to do to favor progress in the right direction. Too many of us are not as helpful as we should be in sustaining our journal. It would be well for us to ask ourselves, "What can I do to assist in advancing this cause?" One of the essential helps for every enterprise is money. A good share of the income of most periodicals comes through the advertising. As has been well suggested by our friend from Salem, there are many sources other than the special dealers from which we may advantageously obtain an extended variety of supplies. We should use our influence to have those who can furnish materials, tools, and instruments useful for us make themselves and their wares known through the advertising pages of our journal. The advantage would be mutual.

The International Dental Journal has always had high merit in its reports of society meetings and in its extended original articles. It has been said that it might do better in having, in addition, more short, simple items not requiring much energy to write or to read, but which would be practical suggestions. It is in the power of every dentist to make, within the compass of a

few lines, a half-page, more or less, reports of cases, suggestions about doing certain things and overcoming difficulties, that would be useful to others. If we will, each one of us, two or three times a year, contribute ten lines to the JOURNAL, the aggregate will be a large mass of material that will increase its attractiveness and be a great benefit to all concerned.

Dr. Briggs.—I was very much interested in Dr. Allan's paper, and heartily concur with him in all that he has said; and it seems to me that anything that we could do to prevent the domination of the trade journal is of the greatest advantage. The question of the ways and means of doing it is a complicated one, and I do not intend to go into it; but there is one point in particular that I want to bring out, and that is in regard to the education of the dentist. If he starts with an education as an all-round man, dealing with a specialty of medicine, the thing will work itself out in time.

Another thing I wish to refer to is the domination, the control, and the dependency of the dentist on the dental depot, and there again the education of the dentist comes in. It is simply the habit of following in the ruts of custom or tradition that has allowed men of the dental profession to be led about, dominated, if you please, by the dental depot. I have had that same thing said to me that Dr. Allan remarked as having been said to him,—"What would you dentists be if it were not for what we have manufactured for you?" It is a fair sample of what we as dentists may have said to us. It does not take much intelligence to see that we have made the manufacturing companies, and not they us. At the same time, we are to blame for the way that we allow them to dictate to us, and, as it were, adopt us, tell us what we want, what we should do, and what we shall have. I think, perhaps, we lack a little dignity in our dealings with them.

Dr. Fillebrown.—Dr. Allan referred to the means of remedying this condition. I think he made a good point in quoting the Century Dictionary. I think that definition is in accordance with the general public estimation of the dentist, and it is also true that the medical profession judges the dental profession in the same way. There are notable exceptions in both cases, of course. The paper also alluded to the fact that if the medical profession could know more of dentistry, that there would be the commencement of the remedy. It seems to me that this is not only the beginning of the remedy, but it is the one essential feature of it. I am glad I have an opportunity to talk to medical men about this matter to-night. I wish to call attention to and emphasize the ignorance of the

medical profession in regard to the diseases of the human system which are dependent upon the teeth and their conditions. There is a most lamentable ignorance in that direction. This is not a reckless statement. My relations to the surgical clinic in the Harvard Dental School has brought this fact very strongly to my attention. I have known cases in the hands of some of our best surgeons in New England which have failed to be cured, but which have been readily cured at our clinic. One of them was a case of a patient with disease of the antrum that had rendered him utterly incapable of doing business. His antrum had been opened two or three times and treatment prescribed, but no relief was obtained until he came to our clinic. Eight badly abscessed roots were found, one or more of the abscesses discharging into the antrum. The removal of these roots and the treatment of the antrum enabled the patient to resume his work in a short time. Now, if that surgeon had known one-quarter as much about the teeth as he did about the other parts of the body, he would not have made that mistake.

An eminent surgeon took a man suffering from an abscess caused by the root of an inferior molar,—and only half a root at that,—and operated on him twice for necrosis, leaving big scars on the jaw. That patient finally came to what medical men regard as a second-rate institution,—a dental infirmary,—and received complete relief. So long as such ignorance prevails we cannot expect medical men to understand the position of dentistry. I could multiply these two cases by twenty without any exaggeration whatever. If our medical schools will insist that physicians shall know as much about the relations of the teeth to the various parts of the human system and the influence of their diseased conditions as they do about the effect of other diseased organs on the body, we shall then have a physician who will respect dentistry, and who will be a great deal more of a man himself. So long as our medical schools ignore a part of the human system, and neglect to instruct their students as to what its relations are, just so long will this unsatisfactory state of affairs exist. This is what I have preached for twenty years. We should be educated as medical men are, and each student be given particular instruction in regard to the specialty he intends to follow. Now, if the Harvard Medical School will add to its curriculum instruction in regard to dentistry,—a thing which they ought in all common sense to do,—and shall insist on as good a percentage in that course as in other studies, the time will not be long coming when patients will suffer less and dentists will be respected according to their ability.

Dr. Bradley.—It was my intention not to say anything, but the remarks that have been made call to my mind the fact that in preparing for the alumni exercises next June the committee of management have arranged for a series of papers and discussions, and one member of that committee has this evening spoken to another member about writing a paper which will treat on ideas very similar to those suggested by Dr. Andrews this evening, such as professional etiquette, not only in relation to how we should conduct ourselves in meeting brother operators, but in relation to how we should meet our patients and talk with them in reference to their former dentists or professional advisers. And I venture to say that in the school with which the gentleman is connected there is much indirect teaching of professional ethics as to what the student or dentist should be, and the building up of a professional character. It is indirectly done, but I sincerely believe that a great deal of the best instruction is given indirectly. A young man sometimes takes up with suggestions that are made indirectly, when the direct instruction is neglected.

From the paper and the discussion which we have listened to this evening it appears that we are striving for the ideal; that no profession has attained to it, as we have learned from the remarks of members of the medical profession and of the clergy, but we are all striving for the ideal. We need a higher ideal of the laity, as well as for the professions. It will take a long time to inculcate among them those principles which are necessary to those wishing to become useful citizens and desiring that which is best for themselves. I am encouraged to think, from my observations in this direction, that the trend is towards a higher ideal,—to leave the lower standard and come up into a higher plane of living. I think the American Academy of Dental Science has been active in working towards this ideal. It is within a few months that resolutions, framed by a member of this society, were passed, condemning the advertisement in the professional journals of nostrums and secret preparations; and I am also persuaded to think that it was that action which has started this agitation in favor of independence in dental journalism. I therefore feel that there is encouragement for us to go forward in the work of striving for a higher ideal in our professional life.

My good friend, Dr. Brackett, asks what we can do to favor our progress in these matters. Just this: see that the colleges carry along with them in their instructions to their pupils this helpful higher influence, and when they graduate give them helpful, strong

literature that will reflect all that is best and highest in our profession and keep the degrading influences in the background.

Dr. Bradley.—Mr. President, I wish to move that a hearty vote of thanks be extended to Dr. Allan for his admirable presentation of this subject.

Vote passed.

Dr. Allan.—I feel very much pleased, gentlemen, with the kind way in which you have taken my paper. I assure you most earnestly that I believe the main idea, the essential idea, is one that in the end will be adopted by the profession at large. I heartily regret that my good friend, Dr. Brackett, should have put a meaning on some few things in it which were so different from what I believe and from what I intended to say. I certainly would not have said anything to any one that would have carried with it the suggestion that I had lost my respect for my profession in the slightest degree. My knowledge of the profession and of the honorable stand which it has taken in all questions of professional ethics, the high-minded way in which the members deal with each other, would not allow my thinking for one moment in the way my friend has suggested. I therefore beg that the doctor will deal with me kindly in that important particular. I take it for granted that my language was a little blind to thus put me in the position of being misunderstood.

Having written my paper and read it over, I wanted to throw it into the waste-basket, and if I had had a little more time to write another I certainly would have done so. Perhaps the trouble was that I tried to present the whole subject to the profession in one short paper. I could touch only on a point here and there. What I said about trade influences, the depots of supplies, I think was wholly true,—I do not know that I would want to change anything in that regard. There is no question whatever but that the profession has been staggering under a load of trade influences that from the beginning of our course in this great country has been a burden, an incubus, and an obstacle in our progress in almost every direction. I am thankful to believe that the profession to-day recognizes that fact, and stands ready to throw the burden off just as soon as a possible way is open.

What I should have done, could I have rewritten that paper, would have been to have said just this: we are creatures of heredity and environment. The old German saying has given greatest importance to the first. It goes something like this: "In man's development, a child should be very careful in selecting his parents."

He ought to be, but unfortunately it is not in his power. But the body of man is the resultant of two forces, heredity and environment. We cannot change our heredity and we do not want to. We are a component part of the great body of medicine,—that is, dentistry is simply a part of the healing art, which is a fact that is coming to be more generally understood, and in the end will be recognized as universally as the law of gravitation. What we are we must be, and in a short time those articles and discussions on such subjects as "being a trade" and "sufficient unto ourselves," and all that sort of trash, will be relegated to the waste-basket of useless thoughts and intellectual rubbish.

The idea I would press, were I to write on this subject again, would be that the environments of the dental student should be such that when he leaves his college where he has acquired his education in dentistry, he will take his position naturally, easily as a member of the medical profession. His specialty will be dentistry. The aim and object of which is the medical and surgical care of the teeth and their adjacent and relative parts, and in his studies he should grow up in the atmosphere of the profession of which he is as really a part as the oculist or the aurist. How is it now? I have taken particular pains to inquire and I find it far different. The student of dentistry does not grow up with the idea that he is to be governed by moral and ethical laws to the same extent as the student of medicine, nor to anything like it. He is taught to a great extent that dentistry is an art, a science, something related to medicine, but not medicine; he is to practise on different lines, in a different way, and the whole atmosphere in the dental colleges, so far as I know, is hurtful instead of helpful to the professional instincts of the student when he goes out into the world to practise his calling. Therefore, I say, there cannot be too careful attention, too earnest endeavor, given to this fact in our profession. The student must have his environment such that, when he leaves his institution of preliminary training he will take his proper position in the professional world.

When the student receives his diploma, that is not all. His education must continue. The practitioner cannot remain at one point, he must either go up or down, one way or the other, and the fountain-head of all his instruction, from the time he leaves college, that source from which he is to derive his intellectual food, is the dental literature that comes into his hands, and I regret to say that the major part of that is under the control of the dental depots, with the natural trade ways which they adopt

in the conduct of their business. They have a perfect right to employ the means that are common to the business world; to put their advertisements where they will find customers; to buy up all the current literature obtainable, also patents by the half dozen or dozen relating to one subject, and to select whichever is most profitable for them to manufacture and pigeon-hole the rest, thus depriving the profession of hundreds of useful, important, valuable ideas, which if they had not been patented, but placed on the open market, would have been of the greatest help to us. I am not finding fault with them, nor do I for one instant claim that the general law effects us more than it does them. The special code is what I want to give emphasis to. The moral law is the same for every man, in whatever capacity he may be placed, but we have the express law which says that a man who works for humanity should not bottle up his thoughts or take a royalty on the product of his invention, but should give freely to his profession whatever thoughts, invention, or discoveries he may have made for the benefit of suffering humanity.

So, I say, keep this literature free, keep it in a position where it will not be influenced by pecuniary motives. Just in proportion as you respect yourself will your neighbors respect you.

THE regular monthly meeting of the American Academy of Dental Science was held at Young's Hotel, Wednesday evening, October 5, 1898, at six o'clock.

President Cooke.—We have with us as guest this evening a gentleman who has contributed very materially in the past to the success and interest of this Academy. I am pleased to introduce to you Dr. Horatio C. Meriam, of Salem, Mass., who will speak to us upon "The Meriam Extension Crown," extra tough gold solder, and annealing steel.

Dr. Meriam.—Mr. President and Gentlemen, the chairman of your Executive Committee wrote me a year ago asking if I had anything for the Academy. I had nothing at the time, but later on some things seemed worth reporting, so last spring I wrote him for a night, and he kindly placed this evening at my disposal.

I was troubled to know what to call my report, but finally decided to let it go on the card as you received it.

THE MERIAM EXTENSION CROWN.

BY DR. HORATIO C. MERIAM, SALEM, MASS.

Some years since, I wished to insert a first superior bicuspid without a plate, but objected to cutting into the second bicuspid or the cuspid. I neither wished for the display of gold that would come from banding these teeth, nor did I think well of bands or pins built into teeth that were to be subject to strain in mastication. A new device seemed to be called for, and my plan resulted in the method that I am now to report.

The first molar had been lost and the teeth had separated; the root of the first bicuspid was in place, but was decayed very much and so far up in the alveolus that crowning was impossible. I wished to arrange for sightliness, cleanliness, stability, and utility, together with ease of repair, if need be, and yet to avoid injuring, marring, or trimming the other teeth.

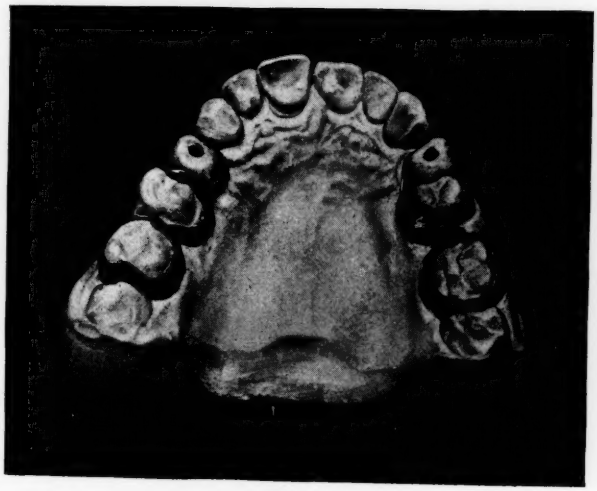
You will recall that the second superior molar often tapers slightly, being a little larger at the neck than at the crown, and so will allow a band to be fitted and forced up tightly without trimming. This tooth was banded, the band being made extra thick on the buccal surface, so that it could be cut narrow and show a portion of this surface of the tooth. The remaining por-

tion of the root of the bicuspid was cleaned and filled with gutta-percha, and a small oval cup of heavy plate was made to fit against it, opening downward. An English tube-tooth was selected, ground to place, and then banded, the band being left wide on the palatal surface. This band was fitted and soldered to the cup, which was then drilled through, corresponding to the hole in the tube-tooth. A platinum-iridium post was soldered in place. This post was long enough to come nearly through the tooth, and was slotted to retain a gold filling (which was inserted after finally setting the tooth in the cap with gutta-percha). The cap was connected with the band on the molar by a strong bar of spring gold wire, No. 16 or 17, or larger, English standard gauge, curved around the bicuspid, leaving it free and clean. An impression was taken with the molar band in place; the cast was then made with powdered pumice mixed in the plaster, the cap and the bar were placed in position, and the piece was then invested and soldered together. In subsequent cases I have either bent up the bar a little where it touched the cap, or have let it run under the cap a little where the alveolus has been absorbed; or, if there was room, have let it pass along the distal surface of the cap. After soldering I have cut the cap away on the labial surface to a mere line, leaving it wide on the palatal and distal surfaces. The cap may be cut narrow or left full width on the mesial surface, the cutting being governed by the amount of gold in view. The tooth is then put in place with gutta-percha or cement, the gold filling inserted and polished, and the piece set in place. The case here, that shows two of these crowns *in situ*, will make it clear to you all.

I have described the one resting against the root. The other, you notice, shows a slight absorption of the alveolus.

You will recall that the law requires (I quote from memory) that a new device shall be accompanied by "such a description as will enable one skilled in the art to which it appertains to make a duplicate." I feel that gentlemen of the standing of the Fellows of the Academy will have no trouble in exceeding the little skill I have in designing and making what I have shown and here present. (See illustration.)

I wish to call attention to one point,—viz., that a tooth with a band secured to a tooth beyond those standing beside the vacant space has the advantage that the tooth is less likely to be tipped, having the full support of the alveolus, and that the alveolus is less likely to be absorbed.



EXTRA TOUGH GOLD SOLDER.

It is desirable to avoid uncertain formulæ in the making of plate or solder. We used to see formulæ that called for the addition of a certain proportion of brass wire or brass pins. Now, brass and brass wire vary, and we can work best if we start with each metal pure and distinct. A very small portion of some metals will make gold intractable. I remember that I once took some gold—old fillings—to be made into pure gold wire, and my man complained that it worked "short." The action of metals in contact in a state of fine division is an interesting one, but too long for this report; but when we learn that one part of tin in a thousand will make gold too brittle to work, we can understand the importance of what I allude to. We use tin constantly in filling, either by itself or in combination with gold, and I think that none of us would overlook this source of danger in making plate or solder, but I think we have not thought of the tin in amalgam; a very small part, even that in an amalgam repair of a gold filling, might ruin the working of plate or solder. I direct my maker to treat all my gold with corrosive sublimate for the removal of tin. The pennyweight is taken as a starting-point and divided into this formula:

	Gold.	Silver.	Copper.	Zinc.
Plate	18 gr	5 gr.	1 gr.	0 = 24 gr.
Solder	18 gr.	3½ gr.	1 gr.	2 gr. = 24½ gr.

You see by this that a portion of the silver is withheld and zinc added to make the melting-point of the solder lower than that of the plate, and that there can be but slight difference in color between them. The slight quantity of copper helps to toughen the solder, and deepens the color of the plate; a lighter-colored plate and a very free flowing solder are made by omitting the copper and adding an equal amount of silver. But the underlying rule of pure metals, and lowering the melting-point of the solder by withholding part of one metal and adding an equal part of another of the same color but of a low melting-point, such as zinc, will allow us to make a plate and solder of any carat that will work well together. You perhaps noticed that the parts given for the solder foot up twenty-four and one-half grains; an excess of zinc is added to allow for loss in melting and in soldering.

In the work that I show you the bands are made of this plate, reinforced and soldered with solder made by this formula. One

side is not polished, and you can see where the solder has flowed; the polished side shows the colors of the plate and solder and the excellence of the match. You will notice the pieces of plate and solder that are now being passed around, and can judge of the color and test the toughness of the solder. You will see that the solder is rolled very thin. I like this for convenience in use and that it cannot be mistaken for plate in the office. I have twenty pennyweights made up at a time, and if of the same thickness they might get mixed.

ANNEALING STEEL.

Man has worked steel from very early times. As boys we were told stories of wonderful blades, the secret of whose making perhaps died with the makers. The blades of some of these old makers are now highly prized by those who make collections.

We have been accustomed to think of steel depending for its quality on its tempering, and by tempering I mean heating to redness, hardening, and then drawing the temper to that desired, either for cutting, springs, or other purposes; but piano wire shows us that a certain quality of steel is produced by drawing, so that it is practically fibrous. The sword-maker's skill was shown in the forging, and he often worked the blade while cold until he got the right temper into it. Jewellers make a small drill, without heat, from pivot wire (piano wire) by flattening it slightly on an anvil, but they do not turn it and strike the sides, for that would break the arrangement of the fibres and cause the drill to split. Many flat instruments can be made in this way if the forging is confined to the side.

Steel for the ordinary instrument is completely annealed in a charcoal fire, and is not brought to the air until the fire has burnt down and the steel is completely cold, thus avoiding even the slight hardening of the surface that might come from contact with the cool air, and giving a uniform annealing. Hardening and annealing are now believed to represent different arrangements of the molecules. This point is not very clear: the supposition remains that the chemical composition is unchanged.

These general facts help us to understand some of our failures in working steel. In drawing the temper of an instrument in a gas flame or a fire and bringing it to the air we get a partial cooling of its surface, so that it is not homogeneous and is unlike the steel annealed in a charcoal fire. In making a small drill, work-

men, after forming it, heat it to redness and swing it quickly through the air, and find this hardens it sufficiently.

Spatulas, scalers, and plastic filling-instruments can be repointed by heating to redness in a flame, bending while there into the required shape, and then flattening on an anvil. Such an instrument will be found hard enough for its work, but soft enough to file to shape or change a little as required while operating. The scaler of Dr. Lord's pattern can easily be made in this way, and I show burnishers made thin and broad, for burnishing contour fillings between the back teeth with a slight rotary motion. They are soft enough to bend a little, but you can test the temper, which is all given by striking on an anvil when cold. They have not been in the fire since bending in the flame. You will notice the appearance of the blade, which is different from that of blades filed to thinness. Some of the instruments shown are repointed from steel that is unsuited for anything but scalers, but these were made in the same way. On some of them you will see serrations such as Dr. Lord now has put on his instruments. Some also are serrated on the back; one is made long and thin, with serrations on each side, and flexible enough to bend and pass between the back teeth at the cervical wall. These are quickly made from excavators, and if one breaks it is only a moment's work to make another. The serrations are made by Dr. Lord with a "crossing file," which I show you.

I now come to a matter which I wish more especially to report, as I do not know that it has ever been brought up in dentistry, nor do I find it in any work that has come under my notice. I alluded a moment ago to the hardening of steel by sudden cooling, the hardening of a small drill in the air, and the partial hardening by being brought suddenly to the air before cooling. It can, therefore, be seen that if we wish to draw the temper of a small, hard instrument, and should draw it, in the usual way, to the color wished for, and then plunge it into water or oil, while we should get the usual result, that result might not be a tough, homogeneous piece of steel, but a piece whose outer surface was harder, or different from the inner, and which was consequently more liable to break. I show here a lot of the small sizes of milliners' needles, which are very slender and about the length of broaches. These have been annealed, and you can see that they can now be bent and twisted in any direction, almost tied in a knot and straightened again, and all the while showing a spring temper. They are soft

enough to file and can be made very thin,—a few days since I was able to follow the pulp-canal in a bicuspid in the mouth of a lady nearly seventy years old.

The needles were, of course, hard when I took them, and were placed, point down, in a thin metal-screw-top bottle, which had a few small holes bored in the top to allow for the expansion of air. The bottle was then grasped at the top with a small pair of soldering tongs, bent to grasp it firmly, and passed, bottom down, back and forth over a bunsen flame until I saw the color come that I wished. The bottle was then withdrawn from the flame and allowed to cool. It could cool but slowly, as glass is a poor conductor and the holes admitted but a small amount of air. In my next lot I shall use a long test-tube, corked, with a slit cut along the side of the cork to allow for expansion and to limit the admission of air. This method may prove of little value, but I am glad to have a means of attaining a uniform temper in so small an instrument. I have not tried to barb them, and doubt if it can be done for the smaller sizes.

In closing let me show two plugger-points that I had made for me by Mr. Grafrath. They are curved right and left, but the points are brought into line with the blow of the mallet.

DISCUSSION.

President Cooke.—I am sure we all feel like thanking Dr. Meriam for the information he has given us. The question is now open for discussion, or rather the three subjects,—the matter of the extension crown, which seems to take the place of a bridge; the question of the gold solder, and the question of annealing steel.

Dr. Eames.—I saw only one of the casts that was being passed around, and that was the extension crown. I would like to ask Dr. Meriam in regard to the length of time he has tested this in use, and if, as it appears, the bicuspid rests on the gum tissue, and if it is easily maintained in a cleanly condition.

Dr. Meriam.—Entirely so, because it has a bell back; it is set in a cup that has a bell back, and while one rests against the gum tissue, it is no longer than the teeth at either side of it, so that it is not forced up. I have no more expectation of trouble from it than I would from an ordinary ring on a lady's finger, and I think the principle can be carried farther. I think the mouth will tolerate a small gold wire that rests firmly on the membrane, as long

as that wire is not irritant and is not movable. When we see what the mouth will tolerate in the way of plates, we are justified in believing that an appliance of this kind will not cause trouble until we see it, and you will see that all parts can be reached with the brush. It is not only clean, but it is bright in the mouth, and I think it has been there about three years.

Dr. Smith.—I simply wanted to ask Dr. Meriam about what I did not quite understand in the description of this bridge. I understood him to say one of the bicuspids is not attached to a root.

Dr. Meriam.—Neither of them is attached, though there is a root in one case. The end of the root is filled with gutta-percha, and the crown, having a cup or ring at its base, rests against it. On the other side of the cast you will see the same principle carried out, except that in that case there is a loss of the alveolus which is protected by this cup.

Dr. Smith.—And the porcelain takes the place of that loss?

Dr. Meriam.—No; merely rests against it. The second molar carries the tooth, and there is very little pressure on the gum.

With reference to the model which you see here, something like sixteen years ago this lady came wishing to have all her teeth out. I had a talk with her, and I have had the care of her teeth since. I did an operation of this kind for a lady patient about five years ago, and when I sent my modest bill the check came back with a note,—"If you had charged me one thousand dollars, I should have called it cheap, but I never could have paid you." This case has a band put on that is supported by the buccal and palatal walls only, the tooth being badly decayed; the tooth was then filled with amalgam. This case I had to repair: I simply sawed the band in two, removed it, repaired the case, soldered the band together, and replaced it.

Dr. Werner.—Is the band on the molar which you first referred to cemented on?

Dr. Meriam.—No, with gutta-percha and oil; but both teeth are conical, and it can be forced up tightly.

Dr. Werner.—The ordinary filling gutta-percha softened with oil?

Dr. Meriam.—Yes; softened with the oil of sassafras, which is rather pleasanter to the taste than some of the others.

Dr. Werner.—I would like to ask for information, how much

articulation,—how much force,—do those cases, in your experience, bear well?

Dr. Meriam.—Only their share, the normal force required of a tooth in a certain position. You will see the force with which the patient eats, from the fact that all the incisors are worn.

Dr. Banfield.—If Dr. Smith will remember, I think Dr. Shaw took in one or two cases of that kind in which he used some such appliance as this bar going around another tooth. I am quite sure he had at least one case in which he used it.

Dr. Smith.—I don't remember it.

Dr. Andrews.—I would like to ask Dr. Meriam what kind of a file that is, and whether they have them finer cut?

Dr. Meriam.—It is called a "crossing" file, and I suppose it is not now used much, as they have machinery for the same work, although they are regularly listed in foreign lists. I think Dr. Lord has had to order them made abroad, and I suppose there would be no difficulty in getting just what you wanted. Abroad they have not the large spirit we have here, and I should say there would be no difficulty in getting a half-dozen files like this, or finer, or coarser, made at a very moderate price.

Dr. Potter.—I fell in with Dr. Melotte, of Ithaca, N. Y., this summer, and I was a good deal interested in some things he had to say. One remark he made was this: "If my office was burned down and everything destroyed, and I was about to equip another, the first thing I would buy would be a machine for rolling plate, and I would build up around that my whole outfit." That showed his idea of the importance of being able to work metal.

I learned from Dr. Melotte that he was not in the habit of using solder for uniting the bands of crowns; he brazed the metals together, in order to keep the metal pliable at the joint. His method of changing the shape of thin corundum wheels, such as are used to trim crowns in preparation for fitting bands, was of interest. This was accomplished by revolving the wheel in the engine and holding against the wheel an orange-wood stick. Sufficient heat is developed to soften the wheel and allow its being spun into any desired shape.

Dr. Werner.—Do I understand that this process of annealing in a test-tube is original with Dr. Meriam?

Dr. Meriam.—I have never heard of it, nor been able to find record of it.

Dr. Werner.—Then of course we ought to be and are very glad

to know of it, and to have it go on record now. We do not want somebody by and by to patent it and make us pay a royalty on a simple way of annealing steel. If we can anneal, reanneal, temper, and retemper our fine instruments, such as broaches and nerve-canal finders, in this practical way, then Dr. Meriam is entitled to our heartiest thanks for teaching it to us.

Dr. Gillett.—If I understand Dr. Meriam rightly, perhaps the main advantage he claims in the manufacture of his own solder is the toughness he gets over solders that he purchases.

Dr. Meriam.—I like to know what I am using. I like the elastic quality in solder; when it is somewhat malleable I do not think it is as likely to break. Then I like a great quantity of solder. I do not like a little pennyweight, which you can hardly find, but I like a long sheet from which I can cut off and use as much as I wish. I also like the exact formula by which you get an exactness of color. Another question is the element of expense. I remember, in my last melting of gold I figured up the cost, and there were twelve dollars saved. For instance, my trade with the shops would be about on this basis: you sell your gold scrap at one dollar; any new gold bought from them would be estimated at about one dollar and ten cents.

Dr. Gillett.—Do you have your solder made by the same metal worker who makes your plate?

Dr. Meriam.—I go to any good refiner and give him my formula, as a physician would a prescription; he follows my directions, and I get exactly what I want. I also take my plate scraps and have those made into plate, but it is not all made according to one formula. There are cases, for instance, where the gum is very much receded, in which I prefer to use a stiffer gold and take more time; that will hold its edge there better than the plate which I use the most of. I use foil scraps for my solder, first having all foreign matter removed, especially the tin. You will notice this smaller crown has a double ring, one ring inside of the other, and the two soldered together; and perhaps you can see how well the solder works there.

Dr. Werner.—Are those flexible burnishers which you showed us on the market for sale?

Dr. Meriam.—I do not know that they are. Those that I have here were made in the laboratory just a few weeks ago. As I have said, the temper in them was obtained by the use of the hammer.

They have never been heated, except for drawing the temper and bending.

Dr. Werner.—They seem to be very nice shapes, and we would like to have them go into the trade, the same as some other good things you have given us.

Dr. Smith.—Before adjourning, I would like to say that it has been a great pleasure to me, as I know it has to all of you, to hear the voice of Dr. Meriam teaching us—as he always does teach us—something new, and I would move that a vote of thanks be extended to Dr. Meriam for his very interesting remarks this evening.

Unanimously voted.

THE regular monthly meeting of the American Academy of Dental Science was held at Young's Hotel, Wednesday evening, December 7, 1898, at six o'clock.

A paper was read by Dr. George T. Baker, of Boston, entitled "Formaldehyde in Dentistry."

FORMALDEHYDE IN DENTISTRY.

BY DR. GEORGE T. BAKER, BOSTON, MASS.

Formaldehyde (CH_2O) is not a new product, but is one whose properties and uses are not at present fully understood. For a number of years it has been known that it was a most powerful germicide, antiseptic, disinfectant, and deodorant, and at the same time comparatively harmless to the higher forms of life. In addition to these qualities it is a very diffusible gas, and for this reason has been adopted by almost all the large cities for disinfection of dwellings and their contents, after cases of infectious diseases. It is also used in the preservation of foods. One part formaldehyde in thirty-two thousand is said to preserve milk for several days.

Gelatin when mixed with formaldehyde is insoluble in boiling water. This fact is useful in photography.

The fact that water absorbs the gas readily to the extent of a forty-per-cent. solution renders it easy of application as a disinfectant in the fluid form. It is this aqueous solution that is found in the market, and it can be mixed with water to form any degree of strength desired.

The different uses to which it has so far been put and the strength in which it seems best adapted to exert its antiseptic and hardening powers are given in a table by F. J. C. Bird (*Pharmaceutical Journal*). The one part of formaldehyde in this table represents two and one-half parts of the full strength, or forty-per cent. solution of commerce.

A SOLUTION OF FORMALDEHYDE.

1: 250,000 kills anthrax bacilli.
1: 50,000 prevents the development of typhus bacilli, etc.
1: 32,000 preserves milk for several days.
1: 25,000 forms a useful injection in leucorrhœa, etc.

1: 20,000 preserves wines, weak alcoholic liquids, and beer; also milk for several weeks.

1: 4000 recommended for moistening paper used to cover jam, etc.

1: 3200 for rinsing dairy vessels, etc.

1 : 2500 destroys the most resistant micro-organism in one hour.

1: 2000 for rinsing casks, and vessels intended for liquids liable to fermentation.

1: 500 as a mouth-wash.

1: 250 to 200 is a general disinfectant solution for washing hands, instruments, etc., in surgery, spraying in sick-rooms, as a deodorant.

1: 160 to 100 hardens microscopic tissues, which should be immersed for a considerable time to give the best results.

1: 100 in lupus, psoriasis, and skin-diseases.

1: 50 to 25 sterilizes surgical catgut, silk, etc., by steeping.

1: 25 for quickly hardening and preserving for microscopical sections; longer immersion in a weaker solution gives better results.

1: 10 for hardening very firm tissues in pathological and histological work.

1: 5 for hardening firm tissues in such work.

1: 2½ for hardening soft tissues for the same purpose.

The fact that formaldehyde is non-poisonous and has no odor of its own but what is easily dissipated makes it useful in many different ways. We have so many products useful in dentistry as germicides, disinfectants, antiseptics, and deodorants, that it may seem unnecessary to add to the list, but formaldehyde seems to possess qualities that in some cases recommend it above all others.

For sterilizing instruments it seems to be of great value. It is efficient, neat, quick, and inexpensive. The instruments may be immersed in a solution of formaldehyde, but a far better way is to expose them to the gas.

Since the warm dry gas does not attack metal or injure in any manner the most delicate material, all sorts of instruments can be easily and quickly sterilized. This includes the hand-piece of the dental engine, rubber-dam holders, napkins, operating-coats, —in fact, everything connected with the office.

Drs. Reik and Watson, whose work is reported in the Johns

Hopkins Hospital *Bulletin* (December, 1897), have experimented in this direction, and after giving their work in detail they state "that instruments can be sterilized in a small chamber in from ten to fifteen minutes, using respectively five or three grains of paraform to the cubic foot of space."

Some three months later (March, 1898) Dr. Reik made a supplementary report, in which he repeated his former statements and said, "My conclusions are, then, that we have in this method a rapid, cheap, easy, and sure method of sterilizing instruments without in any way injuring them."

To corroborate the above, we have the report of Elmer G. Horton, B.S., from the laboratory of Hygiene, University of Pennsylvania. (*Dental Cosmos*, July, 1898.) Mr. Horton took chisels, excavators, and burs, proved them sterile, infected them from cases in the operative clinic of the department of dentistry, placed them in a sterile tube, and dried them in an incubator for three hours. Those infected instruments were then exposed to the fumes of formaldehyde for from ten to fifteen minutes.

After explaining the results in detail, Mr. Horton says, "We conclude that infected dental instruments can be disinfected without injury in a closed space of less than one cubic foot, by an exposure of fifteen minutes to the formaldehyde gas generated from a pastil containing five grains of paraform by heating the pastil over a proper alcohol lamp."

These and other experiments of men of authority all point to the fact that in formaldehyde we have a very desirable product and one that for many purposes in dentistry is bound to replace other inferior and objectionable disinfectants.

Dr. G. T. Baker.—Thinking that the subject of formaldehyde might be a profitable one for discussion, I have prepared just a few words to read concerning it. Before reading, I will take this pastil, which is the gas in solid form, and by putting it in this cup, and then placing the cup over the lamp, and the lamp in the oven, the gas will be generated before I am through reading. One of these pastils contains five grains, which is sufficient to destroy any bacteria or disease germ in a cubic foot of space in ten minutes. This oven contains just one cubic foot.

This other apparatus is a formaldehyde generator. It generates the gas from wood alcohol. This lamp is filled with the alcohol, then inside this tube are two disks, and below are holes to

allow the admission of air. When it is lighted, these disks become very hot, and the fumes of the wood alcohol, mixed with air passing up through the tube and over the incandescent disks, become converted into formaldehyde gas. Mr. Chase, of Melvin & Badger, tells me that this is probably the way in which all formaldehyde is manufactured in Germany and France, only on a very large scale, of course, but the operation is the same as that lamp.

In regard to this oven. I have for experiment put the lamp in there with no pastil in it, and have found that the supply of oxygen is just enough to keep the lamp burning for from six to fourteen minutes, depending on the height of the flame, and it is just about the same when the lamp contains a pastil and the gas is being generated.

DISCUSSION.

President Cooke.—We are all surely interested in this method of sterilization. The subject is now open for discussion. I would like to ask Dr. Baker to inform us what he uses the large lamp for?

Dr. G. T. Baker.—The large lamp is not used at all. I simply brought it for the purpose of showing how the gas is manufactured. Most, if not all, of the formaldehyde used in this country is manufactured in Germany and France, and this is the way it is done, —the fumes of the wood alcohol, mixed with air, pass over these heated disks and the result is formaldehyde gas.

President Cooke.—Could it be used for the fumigation of a room after a person had been sick in it?

Dr. G. T. Baker.—That is what it was designed for. There are a great many formaldehyde lamps on the market, but the lamp that uses the pastil is the best. The pastil, which is called paraform, is the gas in solid form, and by putting it in the lamp the heat sets free the gas and you get pure formaldehyde.

President Cooke.—What is the cost of an outfit like that?

Dr. G. T. Baker.—I think about $6.50. They have them at Metcalf's, Codman & Shurtleff's, and other dealers. I bought my oven and lamp at Bassett's, and it seems to work very nicely, and I put all sorts of instruments in the oven overnight,—clean them first and then sterilize them. Of course instruments to be sterilized must first be cleaned. They may be thoroughly cleaned by the use of soap and water, and still not be sterile. It is a deodorizer as well as a sterilizer, and the deodorizing property to me is fully as useful as anything else. Sometimes we want to get rid of odors; for instance, in the course of our work we are brought

into close proximity with our patients, and supposing one person used a certain perfume very disagreeable to another, this can be readily overcome by deodorizing your office coat.

Dr. Williams.—It will clear a room of the odor of tobacco, and it seems to me an excellent thing for sterilizing the hand-piece of an engine. I do not know of any other way that it could be sterilized unless taken apart.

Dr. Stevens.—I was asking a man the other day, who was in my office explaining the merits of thycalol, why they did not use formalin for the antiseptic. He said it was no use putting it in, because it would evaporate, and would not remain in the solution. I wondered whether that was true. We have some solutions that claim to have formaldehyde in them, but whether it evaporates and leaves the residue I would like to know.

Dr. Fillebrown.—It will dissipate in a very short time. I use it a good deal in my case of instruments, saturating absorbent cotton with it, and it will fill that case with formalin gas, but it will not be very long before the cotton will be dry.

Dr. Stevens.—I should expect this result; but suppose it was in a solution, and kept corked as solutions usually are, will the formaldehyde evaporate?

Dr. G. T. Baker.—It will stay in a solution if proper care is taken. If put on cotton or instruments, I should not be surprised if it did evaporate very quickly, as it is very diffusible, but I know that it will keep its strength in a solution in a bottle for a long time.

Dr. Maxfield.—How can you test whether it has lost its strength or not?

Dr. G. T. Baker.—You can test its strength by the taste or smell. It makes a valuable thing to use as the antiseptic element of a mouth-wash. As a guide in making up solutions, I would say that ten drops of the forty-per-cent. solution to an ounce of water makes about a one-half-per-cent. solution formaldehyde, and this is strong enough ordinarily for the mouth, while for a gargle for the throat a much weaker solution should be used.

For sterilizing instruments the gas is to be preferred to the solutions.

Dr. Taft.—Do I understand that you use that after every operation?

Dr. G. T. Baker.—Every time you want to be sure that you

have a sterile instrument. I make a practice of putting my instruments and office coat in the oven and leaving them overnight.

Dr. Taft.—What do you do about your hands?

Dr. G. T. Baker.—It is a splendid deodorizer. For instance, if you have been treating a pulp-canal, a one-per-cent. solution will deodorize your fingers perfectly; it practically has no odor of its own.

Dr. Taft.—Is it not just as important that you sterilize your hands after each operation as well as your instruments?

Dr. G. T. Baker.—You can do that, if you wish.

Dr. Taft.—Do you do that after each operation?

Dr. G. T. Baker.—No; I do not, as a rule. I simply wash my hands thoroughly in soap and water, occasionally using formaldehyde for deodorizing.

Dr. Taft.—I do not see why soap and water will not do for the instruments just as well.

Dr. G. T. Baker.—Hot water will, if you leave them there long enough.

Dr. Werner.—I would like to ask Dr. Baker,—for I think this is a very practical and nice thing for us to know, and it is a subject which we should not attempt to ridicule,—I would like to know what the disks in the funnel of the large apparatus are made of?

Dr. G. T. Baker.—They are made of copper.

Dr. Werner.—This matter was incidentally referred to before in our Academy during the discussion of another subject, and, if I remember correctly, the gas was generated with a funnel, or chimney, in which the disks were platinized asbestos. Is this an improvement over that method?

Dr. G. T. Baker.—I cannot say. I am only familiar with the method that generates the gas by heating the pastils over an alcohol lamp. Drs. Reik and Watson, and Mr. Morton, of the bacteriological department of the University, who have studied and written upon this subject,—all three of those gentlemen say that this is the most perfect method yet devised for generating pure formaldehyde gas.

Dr. Eames.—I am in hearty sympathy with what has been said this evening in regard to this sterilizer, but there are some things to be said regarding it, as a new thing, not entirely settled. Are we not carrying organisms into the mouth quite as well by means of bibulous paper or cotton, as by instruments or hands? Cer-

tainly, to be truly surgical, the hands, the absorbent cotton, the bibulous paper, or anything that is put in the mouth, should be thoroughly aseptic. It is a question whether boiling is not the surest sterilizer for those instruments or those materials which can be boiled. With the mouth-mirror and the right angle of the engine, there is a question whether it is not best to immerse them in a solution rather than to subject them to the formaldehyde gas. A recent German paper makes the statement, and no doubt it has been verified by others in this country, that if there is a layer of moisture on the instruments when they are put in a sterilizer of this kind, it fails to do the work. Last evening I was present at a meeting of the Metropolitan Society, and Dr. Lamkin, of Lynn, presented a sterilizer which he had modified from an ordinary tin cake-chest. This, with the lamp at one dollar and a half, makes a sterilizer which costs only one-third the price of the one shown this evening. This modification, if successful, will be of interest to dentists generally.

Dr. Belyea.—I have tried the cake-box with the formaldehyde gas for sterilizing. The only trouble I had with it was the rusting of some of my instruments. Possibly that was caused by a leakage of air, the cake-box, of course, not being thoroughly air-tight.

Dr. Potter.—I am very glad to see this question of sterilization brought out. It is one in which I have for a long time taken a great deal of interest. Personally, I prefer to boil my instruments in order to sterilize them. Still, I recognize the fact that there may be other ways of accomplishing the same result. For the benefit of those who boil their instruments, I wish to mention a boiler which I found this summer and which I have used with a good deal of satisfaction. It is an enamelled steel asparagus dish fitted with a perforated tray. Instruments can be placed on the tray and then immersed in the boiling solution. These dishes can be bought at F. A. Walker & Co.'s, 85 Cornhill, Boston. With regard to formaldehyde, I have been watching the literature for some time. You know very well the extravagant claims that were made for it when it first came out. It was said that formaldehyde gas would search out bacteria, even when wrapped in blankets and hidden away in mattresses. Late experiments show that formaldehyde gas will not reach bacteria so placed except in a vacuum chamber. It has also been very clearly shown that formaldehyde gas does not penetrate moist substances. There are, therefore, limitations in the use of formaldehyde gas which cause one to hesi-

tate before adopting it as a sterilizing agent. And yet it may prove to be the most desirable means which we have of sterilizing instruments. I am looking forward to it with a great deal of expectation, knowing that there are undesirable things connected with heat sterilization which I would be glad to get rid of by the adoption of some other method if I could feel certain that the new method would accomplish the desired result.

I would like to refer the Academy to an excellent paper by Dr. Charles Harrington, of the Harvard Medical School, entitled "Possibilities and Limitations of Formaldehyde as a Disinfectant," published in the *American Journal of the Medical Sciences*, January, 1898.

Dr. Werner.—Will the essayist please tell us the solution of formalin he uses on his hands that he thinks is strong enough as a sterilizer and deodorizer and yet would not be injurious to the skin?

Dr. G. T. Baker.—I think it is a question as to the exact strength that is required. The different authorities give a slight difference as to what strength should be used. Mr. Bird says 1:250 formaldehyde for general disinfectant solution for washing hands, sterilizing instruments, etc. That would be equivalent to a 1:100 of the forty-per-cent. solution, or one per cent. I do not think it makes any great difference. In my use of it I put about one teaspoonful of the forty-per-cent. solution into the bowl, containing about one pint of water, which makes about one-half per cent. formaldehyde solution, stronger, perhaps, than need be, but it does not affect the hands, though it does deodorize them, and according to the authorities it does sterilize them.

Dr. Werner.—I think that is practical information. My difficulty is in deodorizing my hands after cases of pyorrhœa alveolaris and putrescent pulps. They are the most disagreeable odors to get rid of. You cannot do it by merely washing your hands in soap and water, unless by the addition of something else to disguise it, which may be equally as disagreeable to the patient.

Dr. Fillebrown.—I wish to say a few words to commend formalin to the attention of those who have not used it in connection with the care of their instruments. I was fortunate in obtaining a package from the first importation that was made from Germany. Dr. Jack spoke to me about it, and I have used it constantly ever since. The directions for its use are essentially the same as they were at that time,—that is, that one-half of one per cent. was sufficient for all ordinary cleansing purposes. It takes the place of

bichloride, 1:1000, and of course of anything weaker. It is unnecessary, I think, in an ordinary dental practice to sterilize the instruments more than once in twenty-four hours, and if you have a solution 1:100 of formalin that your instruments are washed in after using them, you will have them thoroughly aseptic during the day. Formalin does not rust the instruments and keeps them perfectly clean. I have one of the sterilizers, and I find it an excellent thing to put in many of my instruments, napkins, sponges, and leave them there overnight, and they are all ready for the day's work. It does them no harm to leave them there. I have allowed instruments to remain two days in the sterilizer and when I took them out they were in perfect condition.

Professor Ernst thinks that if instruments having no grooves are washed clean in a 1:100 solution and put in a case in which I keep a piece of cotton saturated with the formalin, it is abundantly sufficient to destroy all the germs on them. It being so easily used, I think it is a very valuable thing.

Speaking of the strength which could be used in washing of hands without injury, I had the temerity when it first came out to wash my hands in the full strength,—that is, forty per cent. formaldehyde. There was no great harm done, although it was a little rough on the cuticle; but weaken this with four or five times its quantity of water, and you can use it with perfect impunity on the skin.

Dr. Maxfield.—There is one other point I would like to see brought out to get the experience of the gentlemen present. You will remember that when formalin was first introduced as a disinfectant Dr. Howe experimented with it in the treatment of pulpless teeth, and he reported to the Odontological Society of New York several cases where he had been unable to close the canal when using other antiseptics, but by using formalin in the canal he was able to close it with no trouble; that is to say, in those cases an irritation had been set up within ten hours after closing the cavity where some well-known antiseptic had been used, but after using the formalin no further trouble occurred. Now, my experience in that way has not been very encouraging, for it has seemed to me in my use of it in pulp-canals that it has acted more or less as an irritant; the gas seemed to penetrate through to the end of the root and cause considerable pain, and pain that was not easily controlled. If the members would state what their experience has been in such cases, I would be very glad to hear it.

Dr. Allen.—I can add to Dr. Maxfield's testimony on that line. I have reason to believe that formalin caused very severe pericementitis where I applied it a few weeks ago, and it was not easily controlled. I used it as a disinfectant in a cavity before filling.

Dr. Williams.—Mr. President, I have had several instances of that sort, and on the general principle that formalin is an irritant, we should be very conservative in its use. With that knowledge, I avoid putting it into the ends of roots that are open. If there has been some previous disinfection and the end of the root is stopped, then of course you can sterilize the rest, if you please, with formalin. But, although readily effective, I have also found that it is not a durable disinfectant. It is rapidly dissipated, and unless there was some sort of reservoir to hold the supply, I should not want to depend upon it for permanent disinfection. It seems to me that a more permanent effect could be obtained by the use of some of the phenols, but if a person should wish to use formalin, I would emphasize the importance of avoiding making applications where it may get access to the vital tissues.

Dr. Maxfield.—I would say that I used a two-per-cent. solution in the canals in the same manner as described by Dr. Howe.

Dr. Williams.—To carry out a little analogy of the thing: You know of course the essential principle of this is formic acid, which is the same as the bee puts an atom of into the honey to preserve it. If the honey is taken out of the comb, the formic acid evaporates and the honey changes in appearance, and we know how the sting of the bee evaporates; so this is practically the same principle,—we are simply using the poison of the sting of the bee in a dilute form.

Dr. Brackett.—My experience with formaldehyde has been, I might say, superficial, from the fact that I have made no special study of the subject, and yet it seems not to have been in accord with those of the gentlemen who have just been speaking. It was first brought specially to my attention by Professor Wolcott Gibbs. A few years ago he brought to my office a one-half of one-per-cent. solution. That solution was the strongest that I had as a starting-point, and diluting that somewhat, so as not to be at all unpleasant to the taste, I used it in washing out alveolar abscesses and for various cleansing and sterilizing purposes without ever noticing any such results as the speakers have just mentioned. The dilution was made without accuracy, but probably the solutions used in my syringing out of alveolar abscesses and for similar cleansing

purposes were not stronger than from one-twentieth of one per cent. to one-tenth of one per cent. I have also used these weak solutions for dipping the cotton which I have used as dressings in pulp-canals, and also as an antiseptic in cases of pyorrhœa alveolaris. I have no memory of any serious after-pain resulting; a little transitory smarting is the most serious that I remember. In my use of it, it did impress me as a valuable agent for all the objects that I have mentioned, but the dilution was quite considerable.

Dr. Williams.—You will notice that Dr. Brackett says that even with these very weak solutions there were some cases of transitory irritation.

Dr. Brackett.—It could hardly be called an irritation,—just a brief smarting, such as might come from the application of alcohol. I do not remember any intractable pain or anything that persisted for more than a very short time.

Dr. G. T. Baker.—One point has not been spoken of to-night, —that is, the use of formaldehyde in teeth with live pulps. It is a great irritant, and should be used in very weak solutions, and in teeth with live pulps I do not think that it should be used at all. I have never had any experience in using it that way, but I have heard that it will destroy the pulp just as arsenic will, but in pulpless teeth I think that it makes an excellent disinfectant if used in sufficiently weak solutions. I know the first time I used it for the disinfecting of a pulpless tooth, I used about a one-per-cent. solution, and the patient came back, complaining that the tooth was aching, so after that I used weaker solutions, and have never had any trouble since. The solutions of formaldehyde are not recommended for the sterilizing of instruments, as it has been found that the gas itself can be used more conveniently and will sterilize them perfectly, according to the testimony of eminent bacteriologists, and they all agree that it is one of the most powerful germicides known. Dr. Peck, of Chicago, lately made some experiments to determine the comparative strength of solutions of formaldehyde and bichloride of mercury, and he found that one in one thousand solution of bichloride of mercury was three to four times as powerful as a one in one thousand solution of formaldehyde. He also showed that the concentrated solutions of formaldehyde were very irritating and should be handled with due care.

HARRY E. CUTTER, D.D.S.,
Editor American Academy of Dental Science.

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